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REVERSED THE LOCALS.

SUPERVISING INSPECTOR SLOANE EXONERATES CAPT. W. J. HUNT OF THE ROCKEFELLER STEAMER NEILSON FROM FAULT OF ANY KIND IN CONNECTION WITH THE SINKING OF THE TUG RECORD AT DULUTH.

Lake vesselmen will remember that in December last the local steamboat inspectors at Duluth, Messrs. Monaghan and Chalk, suspended for a year the license of Capt. W. J. Hunt of the Rockefeller steamer Neilson, on account of the sinking of a tug in Duluth-Superior harbor. The case was one of general interest, as steamboat captains to whom the facts were submitted were all of the opinion that a mistake had been made in taking Capt. Hunt's license from him. Hon. John D. Sloane of Dubuque, Ia., supervising inspector of the fifth district, has now reversed the ruling of the Duluth inspectors. His letter on the subject to Messrs. Monaghan and Chalk, dated the 9th inst., goes into the case fully and is as follows:

"On Dec. 12, 1899, you suspended the license of Capt. William J. Hunt for a period of one year, commencing Dec. 12, 1899, and ending Dec. 11, 1900, for alleged violation of that portion of Rule VI which refers to vessels being navigated in crowded channels or the vicinity of wharves with great caution. It appears that on the date of the alleged violation the steamer James B. Neilson entered the harbor at Duluth, Capt. W. J. Hunt in command, and was being assisted to her dock by the tug Record, Capt. Wm. C. Burnett in command. That when the vessels had arrived at a point about 3,700 feet past the bend, or about opposite the new elevator, the Neilson ran up on the stern of the Record, rolling her down so that she filled and sank. It is claimed by witnesses on the tug that the steamer Neilson was being navigated at an excessive rate of speed, estimated at 11 miles an hour, but the witnesses of the Neilson claim she was not running to exceed 5 miles an hour at the time the accident occurred.

"Under date of Dec. 10, 1899, I received from Capt. Wm. J. Hunt notice of appeal from the decision of the local board at Duluth; also a communication wherein he expressed himself as being satisfied with the manner in which the investigation was conducted by you, that he had no additional testimony to offer, and that he would abide by any decision I might arrive at, based upon the testimony submitted. On April 7, 1900, I visited Duluth and examined Mr. R. F. Barrows in the engine-room of the tug Record, in the presence of Capt. William J. Hunt and William C. Burnett, and it was practically demonstrated by the evidence that it was impossible for Mr. Barrows, the engineer, while on his knees in the act of oiling the machinery to even reach the lever when the throttle valve was open to its full capacity.

"After a careful examination of the testimony I find that Capt. William J. Hunt, of the steamer James D. Neilson, exercised due precaution by stationing himself on the top of the pilot house, the mate on the forward turret, which position gave him an unobstructed view of the harbor and its surroundings. The captain asserts that the rate of speed of the Neilson did not exceed 5 miles an hour at the time of the collision. This statement is corroborated by the mate, wheelsman and chief engineer. The time of leaving the piers, as shown by the log of the Neilson, was 5:20 a. m., and the time of the accident 5:45 a. m., and the distance as given on United States engineers' map of Nov. 17, 1899, is 8,970 feet, or 1.69 miles from piers to point where accident occurred, so that the average rate of speed was 4.05 miles an hour. In addition, the captain, wheelsman, chief engineer and oiler of the steamer Neilson, who were on watch, all swear that the rate of speed was not increased after entering the harbor.

"The after ballast tank only being filled, leaving three empty, depressed the stern of the Neilson, which resulted in elevating the steamer's high and protruding overhang, peculiar to this type of vessel (whaleback) at the end, to a distance above the water variously estimated by Capt. Hunt and by Capt. Burnett at 18 to 25 feet, being at least 15 feet above the deck or stern of the Record. Under these conditions, Capt. Hunt swears he was unable to see the Record from his station on top of the pilot house. The mate also states that the position of the Record was not visible and that he could not see the Record when dead-ahead; also asserts that the Record dropped back under the bow of the Neilson 40 feet; when he discovered the position of the tug, he immediately passed word to the captain to go slow and give her a turn back, and from the movement of the boat the engines must have been reversed. The statements of the engineer and oiler show that the engines were stopped and backed strong, about five or six revolutions. At no time was the Neilson signaled to check her speed. Capt. Burnett of the tug Record states that the Neilson was increasing her speed from the time she passed the Ohio coal dock to time of accident; consequently it was necessary for him to increase his speed in order to keep out of the way of the Neilson. The distance from the Ohio coal dock to the point where the accident occurred is 3,700 feet, taken from United States engineers' map, or 7/10 of a mile. At a constant rate of speed of 11 miles an hour, the time required to make this distance would be 3.81 minutes, time sufficient to have either checked the speed of the Neilson, or to have 'dropped back with the line dragging,' which maneuver Capt. Burnett contemplated executing if the Neilson ignored the signal to check in passing a dredge in the channel. Instead of giving the Neilson a check signal, or throwing his wheel hard over one way or the other, avoiding the direct course of the Neilson, and again shifting the wheel to bring the tug parallel to and outside of the path of the steamer, which action would have obviated the danger, Capt. Burnett made no effort whatever to determine the position of the Neilson. Said action can only be justified by the fact that he did not consider the rate of speed at all dangerous. He admits that there was an unobstructed view from the pilot house of the tug Record aft; that he could not see over the bow or forward turret of the Neilson; that the captain of the Neilson would not be able to see the tug if he stood in the center of the pilot house (pilot house of the Neilson estimated to be 10 to 12 feet athwartships and 250 to 280 feet aft); that he did not even look aft to ascertain the position of the

steamer or to locate the captain; that he knew it was his privilege to check the steamer by signals or whistles, and that, in fact, it was his intention to do so, on account of a dredge some distance ahead, which they were not allowed to pass at a speed exceeding six miles per hour. Quoting his exact words: 'I intended to check her down, and if the steamboat would not check down I would have dropped back with the line dragging so as to show the man on the dredge I was not to blame'; and further that the engines were being operated to their full capacity, throttle valve wide open, the speed of tug being about 11 miles an hour, which statement is corroborated by the engineer. I am of the opinion that had the throttle been open to its fullest capacity at any time, Capt. Burnett's attention would have been directed to it, as was that of the mate of the Neilson, who noticed the tug's exhaust suddenly increase in intensity, and in looking over the bow of the Neilson saw the tug under the bow, demonstrating the fact that the throttle was not opened wide until the engineer, who was on his knees in the engine room oiling the machinery, felt the shock of the collision, the first indication to those on the Record that the line was slack. He immediately sprang to his feet, looked out and discovered that the Neilson had lapped on the stern of the Record. Engineer R. F. Barrows of the tug Record in his examination before you on Oct. 10, 1899, positively asserted: 'When I was on my knees I had my hand on the throttle and she was wide open and working all right.' On April 7, 1900, Mr. Barrows swore that it was impossible for him to reach the throttle when same was wide open and he on his knees, which latter evidence is corroborated in a conclusive manner by the experiment relative thereto mentioned in a former part of this report.

"The only person connected with the tug who watched the tow line (50 feet in length) was the engineer on watch. He also admits it is the privilege of the tug man to blow check whistles to the steamboat in tow, and in addition considers the whaleback the most dangerous type of steamer to handle. If the speed was the cause of the accident Capt. Burnett was, in my opinion, entirely at fault for not even attempting to control, as he asserts, excessive speed, of which the tug master is supposed to be the judge, such being the practice by an unwritten common law in vogue ever since the use of tugs in this capacity became prevalent on the great lakes; but in my opinion the accident was not caused by excessive speed, but was caused by the throttle valve closing automatically while the engineer was on his knees oiling the machinery, permitting the Record to drop back under the bow of the Neilson.

"From the evidence submitted I fail to discover wherein Capt. Wm. J. Hunt is guilty of violating any of the laws, rules or regulations governing navigation, and I therefore reverse your decision by which the license of William J. Hunt as master and pilot was suspended for a period of one year, commencing Dec. 12, 1899, and ending Dec. 11, 1900."

LAKE FREIGHT OUTLOOK.

With the advance ships of the lake fleet moving through the Straits of Mackinaw, and all indications pointing to a general opening of navigation within a week it can truthfully be said that the situation now as to lake freights is just as it was in October last, when all vessel capacity that could possibly be secured at \$1.25 a ton from the head of Lake Superior was taken for the ore trade, which is the greatest item in lake commerce and upon which other rates are based. There is still more ore to be had at this same rate from the head of the lakes, and no indication of any change in the plans that have been made for a movement of freight far exceeding all records of previous years in lake commerce. All this notwithstanding the setback that has taken place in iron and steel lines, which it must be admitted is not an encouraging feature in the general business outlook. Within the past day or two a few charters for first trips with ore from Escanaba have been made at 90 cents, which is 10 cents below the contract rate, but this is not taken as an indication of weakness in freights, as it has been understood from the beginning that Escanaba shippers were more fully provided with contract vessels than the shippers who move ore from the head of the lakes.

A few additions are again made this year to the list of big steamship companies that carry no insurance. It is understood that there will be no insurance of any kind on the fleet of some fifty vessels owned by John D. Rockefeller. The great bulk of the hull business that has been closed has been at rates about equal to last year. About the only change of importance has been a marked increase in the insurance valuations placed upon the vessels, which is, of course, to the advantage of the insurance companies. The English companies—they have again taken the great bulk of the business and mainly through the Prime-McCurdy interests of Chicago—have insisted upon a valuation of £5 per gross ton on steel vessels.

In the transfer of Dry Tortugas to the navy there is established the first fortified naval base under the exclusive control of the navy department. The marine hospital service endeavored to gain possession of it for quarantine purposes but the president held that it was too important strategically to be surrendered. The transfer to the navy also establishes a precedent which may be far reaching. It has been a mooted question with various nations as to whether coast defenses are an adjunct of the army or navy. This would imply that as far as the United States is concerned they are within the jurisdiction of the navy department.

The issue of the superimposed turret seems to be settled—at least for the present. There will be no double turrets built. As no nation has adopted the superimposed turret hitherto this seems quite a natural thing to do. These turrets should be first tested before their adoption becomes general—and actual conflict seems to be the only satisfactory method of testing their military efficiency.

AGAINST DOUBLE TURRETS.

NAVAL BOARD OF CONSTRUCTION SO DECIDES IN PLANNING GUNS FOR NEW BATTLESHIPS—OTHER NAVAL AFFAIRS.

The naval board of construction at its meeting last week decided that the new battleships shall not have the superimposed turrets. The board after carefully examining an alternative plan prepared by the chief of ordnance accepted this in lieu of the double-turreted arrangement. By the new plan the ships will be given eight 8-inch guns arranged in four turrets, one at each corner of the square superstructure. Two main turrets on the main deck will carry each two 12-inch guns. The result of this arrangement will be to give the ships four more 8-inch guns than would be carried in the two double turrets. This change will cause 350 tons additional weight.

The navy department has been called upon to supply technical information for an interesting and important set of experiments now being conducted by one of the largest manufacturing concerns in the country. The purpose is to demonstrate the feasibility and advantage of propelling a ship through power derived from gas engines supplied by gas generated on the vessel itself. The purpose of the experiments is to ascertain whether the weight of this gas-producing plant and gas-consuming engines are so much less than the stationary plant of steam boilers and engines and the saving of space sufficient to warrant the adoption of the new system.

Augustus Smith of New York has been permitted by the department to withdraw his bid of \$5,500 for the construction of building No. 22 at the New York navy yard. He represented that he had made a mistake in his estimate and as such was obviously the case the department took the usual course of permitting the bidder to withdraw his proposal without sacrificing the certified check which is exacted of every bidder. It is likely that the contract for construction will go to the same bidder under another item.

The United States ship Chesapeake, new practice training ship for use of cadets at the naval academy at Annapolis, went into commission at Charlestown navy yard last week. Mortimer L. Johnson, commander of the yard, turned the ship over to Lieut. Commander Charles E. Colahan, who is to command the vessel on her trip to Annapolis. The Chesapeake is a full rigged ship of 1,175 tons displacement, composite hull, with six guns in the main battery.

Naval Constructor Bowles at the New York navy yard has reported to the navy department that the battleship Indiana will be completed by April 21 and the Massachusetts by May 3. The ships will proceed to League island, where they will be placed in ordinary.

Lieut. Commander William Winder has been ordered to take immediate command of the Michigan on the great lakes in place of Commander P. Garst, whose orders to that duty have been revoked.

Charles H. Allen, assistant secretary of the navy, has been appointed by President McKinley to be governor of Porto Rico. Mr. Allen has accepted.

PROGRESS OF NAVAL CONSTRUCTION.

Since the last report of Rear Admiral Hichborn, chief constructor of the navy, upon the condition of naval construction, two ships—the battleship Kearsarge at Newport News and the sheathed protected cruiser Albany—have gone into commission. There is, however, 1 per cent. of construction work still to be done upon them. The state of the other vessels under construction is exhibited by the chief constructor's report as follows: Of the battleships the Kentucky, the Illinois and the Missouri at Newport News are placed at 98 per cent., 76 per cent. and 1 per cent. respectively, advanced toward completion. The Alabama and the Maine at Cramps are placed at 94 per cent. and 24 per cent. respectively, while the Wisconsin and the Ohio at the Union Iron Works are set down at 90 per cent. and 18 per cent. respectively.

Only one of the six sheathed protected cruisers, the Chattanooga, building by Lewis Nixon, has been started. All of the four monitors are under way—the Arkansas at Newport News, standing at 22 per cent., the Connecticut at Bath at 24 per cent., the Florida at Lewis Nixon's at 29 per cent., and the Wyoming at the Union Iron Works at 43 per cent.

Of the sixteen torpedo destroyers now building the most advanced are the Lawrence and Macdonough at the Fore River Engine Co.'s Works, Weymouth, Mass., standing at 80 and 86 per cent. respectively. The Paul Jones, the Perry and the Preble, building at the Union Iron Works, come next at 70 per cent.; and then the Dale and Decatur, building at the William R. Trigg Works, at Richmond, Va., at 68 and 67 per cent. The torpedo boat Goldsborough, building at Wolff & Zwicker's, Portland, Ore., stands at 99 per cent.

MODELS FOR THE PARIS EXPOSITION.

Charles D. Mosher, engineer and naval architect, 1 Broadway, New York city, has just shipped, to be exhibited at the Paris exposition, a number of full rigged models of the fastest yachts and launches he has built and building, among which is the steam yacht Ellide with a record of 40.2 miles per hour, which was built for E. B. Warren of Philadelphia; also a fully rigged model of the twin-screw steam yacht Presto, which he built for J. A. Mollenhauer of Brooklyn, with a speed of 31 miles per hour; and the twin-screw electric yacht Utopian, built for John Jacob

Astor of New York, this yacht being the largest electric yacht ever built. She was fitted with auxiliary sail power and has a speed of 14 miles per hour.

Mr. Mosher sent also a model of the steam launch Viper, built for F. P. Magoun of Babylon, L. I., with a speed of 36 miles per hour; a model of the twin-screw steam yacht Fox, for Richard K. Fox of New York, with a speed of 33 miles per hour, and a model of the 180-foot twin-screw steam yacht Pocahontas. The Pocahontas will have a speed of 33 knots per hour and has very extensive and elaborate accommodations and bunker capacity, enabling it to steam 4,000 miles.

A model is being constructed for the exposition of the 130-foot twin-screw yacht Arrow, which is being built for Charles R. Flint of New York. This yacht will unquestionably be the fastest vessel ever constructed, as she is fitted with very much higher-power machinery than has ever been placed in any vessel of her size, having no less than 4,000 horse power on a displacement of 50 tons. It is claimed that she will have a speed in excess of 40 knots per hour. These models are in each case accurately made to scale, including all the deck fittings, boats, riggings, etc. They were made by Gustav Grahn of Brooklyn.

LIFE-SAVING APPLIANCES FOR PARIS EXPOSITION.

Anthony Pollock, the well-known patent attorney of Washington, D. C., and his wife, were among the passengers lost on the steamship La Bourgogne, in collision with the Cromartyshire. The Pollock heirs decided to offer a memorial prize of \$20,000 for the best life-saving device in case of disaster at sea.

When United States Commissioner Gen. Peck was appointed those having this competition in charge secured his consent to show the devices which might be deemed worthy at the Paris exposition, with a view to stimulating invention along the same lines in other countries. Mr. Peck placed the matter in the hands of John H. McGibbons of his staff, who has since had the matter in charge. H. P. Rucker, in charge of the offices of the commissioners in New York, reports that 112 life-saving devices were received from all parts of the United States, and out of this number the committee has selected ten, which will be sent to Paris. Among the competitors whose devices have been selected as worthy is Chief Constructor Hichborn of the United States navy.

The following named are the successful competitors: John A. Aniello, No. 137 Carondelet street, New Orleans, life boat; Z. C. Angevine, Los Angeles, Cal., life jacket; Francis T. Bowles, United States navy, electric water tight bulkhead door; N. H. Borgfeldt, 221 Rodney street, Brooklyn, N. Y., exact fitting steel belt for prevention of upsetting of life boats; Philip Hichborn, chief constructor United States navy, Washington, D. C., life buoy; W. J. Kennedy, Pier 14, N. R., New York, boat hoisting, lowering and detaching apparatus. This device is indorsed by the committee, very creditably—"best device we have seen for getting boats clear of the ship when loaded with passengers;" Arthur W. McGray, Parker House, Boston, design for ship; W. McKinnon, No. 713 East 136th street, New York, device for swinging out life boats; Robert Nevill, No. 1320 F street, N. W. Washington, D. C., eophone sound detector; C. F. Sultemeyer, No. 1448 Halsted street, Chicago, Ill., life boat.



Five-Masted Schooner Helen W. Martin.

A FIVE-MASTED SCHOONER.

The five-masted schooner Helen W. Martin was launched recently from the yard of Percy & Small at Bath, Me. Her dimensions are: Length, 280 feet; beam, 44 feet; depth, 20 feet; gross tonnage, 2,265. Oak is the material used in the construction of the hull. Steam appliances for handling the vessel include a Hyde steam windlass, wrecking pumps, deck hoisters and donkey boiler. The vessel's lower masts are 118 feet high and topmasts 54 feet. The standing rigging is steel wire set up with turnbuckles. The vessel is for the coasting and foreign trade.

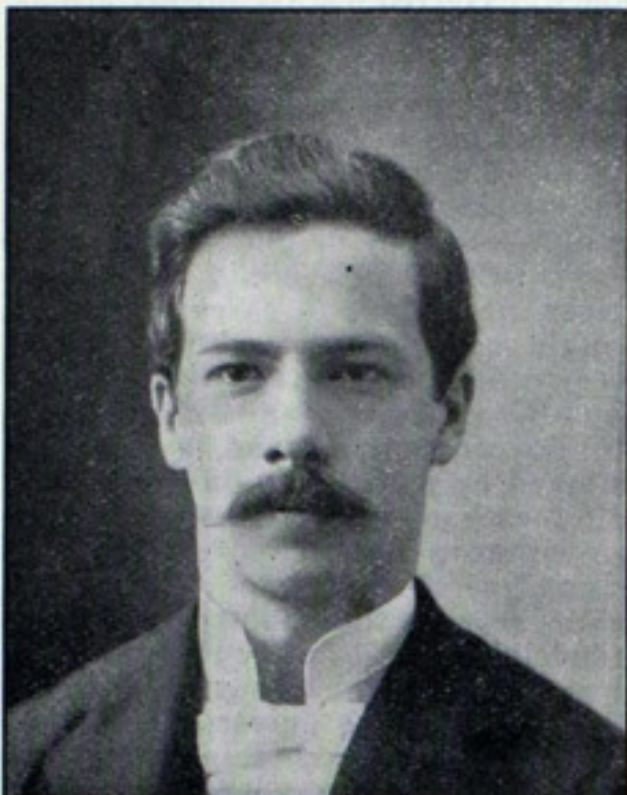
A REMARKABLE PLEASURE CRAFT.

The steam yacht Virginia, owned by Isaac Stearn of New York city, and which is the last steam yacht built by the Bath Iron Works, Bath, Me., is proving herself a remarkable, able and speedy cruising pleasure craft. Her first trip across the Atlantic to Gibraltar was made at an average speed of over 11 knots per hour. This performance is truly remarkable when it is considered that the vessel was only designed to steam under natural draft at a rate of 12 knots per hour in light cruising condition. The Virginia began her trans-Atlantic voyage with all available bunker space filled. She has also proved herself an able sea boat and all experts are unanimous in proclaiming her to be one of the handsomest steam pleasure craft afloat. The Virginia is in command of Capt. L. Jefferies, who, it will be remembered, was skipper of the cup defender Vigilant when she made her record trip across the Atlantic.

A Japanese ship building firm has just turned out a 12,000-ton steel, twin-screw steamer, the Awa Maru, which, according to United States Consul Harris at Nagasaki, who reports the fact to the state department, is equal in every respect, including cabin accommodations, to the best class of Atlantic steamships. Material has been ordered for two other steamers of the same kind for the same line, and two are under construction for another line. The ship building industry in Japan appears to be flourishing, with every likelihood of it continuing so.

WILLIAM A. FAIRBURN.

William A. Fairburn, who recently accepted the position of naval architect and engineer with the Eastern Ship Building Co. of New London, Conn., is well known throughout the country as an authority on matters pertaining to naval architecture and marine engineering. He is also



favorably known in Europe and his recent articles on ship building have attracted much attention at home and abroad. Mr. Fairburn has a good sound education to build upon and his record at Glasgow university will probably never be equalled. After studying five months under Prof. J. H. Biles at Glasgow he took all the final examinations in naval architecture and marine engineering and graduated with the highest honors ever obtained at this well-known Scotch university, at the head of each class. He has had a sound practical ship yard education, working three years as helper, fitter, loftsmen and riveter in an iron ship yard, and his drawing office experience is most complete and varied, he having worked for seven years in Europe and in this country on British, French and American vessels.

Mr. Fairburn was chief draughtsman with the Bath Iron Works for a number of years, and he severed his position as naval architect with that well-known concern a few weeks ago to act as Charles R. Hanscom's assistant in establishing the large new ship and engine building plant at New London, Conn. He has done a great deal of designing and consulting work during the past few years. Sewall's fleet of steel sailing ships are among the vessels that have come from his board. He has already had experience in the design and construction of fifty vessels of almost every type, including some of the finest merchantmen afloat. As naval architect of the Eastern Ship Building Co. he will now have the honor of being the designer of the largest vessels in the world, for the two mammoth Pacific liners that the new company is about to build will have a greater tonnage than any vessels built or projected.

Practical inclinations and good judgment, backed up by an education, are qualifications very much in Mr. Fairburn's favor in the important work he has now undertaken. He knows how to use his talents, is thoroughly in sympathy with his work, and his taste, as proved by his designs, is most excellent. He is a modest man of few words, and yet he is one of the most popular men in the ship building business in the country. He is a young looking man, as is proved by his photograph taken two years ago, but as President Hyde of the Bath Iron Works says, he is not only self made in every sense of the word, but by working night and day has gotten about two years experience out of every one of his life so far. Mr. Fairburn has received to our knowledge many very flattering offers to fill responsible positions during the past two years. He is a patriotic American, enthusiastic over the prospects of and the bright future before the American merchant marine. He believes that with the proper encouragement America will become the foremost maritime nation of the world. Mr. Fairburn is a member of the Institute of Naval Architects (Great Britain), the American Society of Naval Architects and Marine Engineers and of the French Institute of Naval Architects, and an associate member of the American Society of Naval Engineers.

WATER POWER AT NIAGARA FALLS.

The Ontario Power Co. has secured its long-sought-for lease of water power privileges at Niagara Falls, Ont. In Toronto a few days ago John J. Albright of Buffalo, president of the company, secured the contract from the Canadian government, through the commissioners of the Victoria park at Niagara Falls. Mr. Albright paid \$30,000 to the commissioners, equal to two years' rent in advance, as the company is required to pay \$15,000 a year for the franchise.

The new company is in no way connected with the Niagara Falls Power Co., which has a far more extensive grant at Niagara Falls, Ont., and is now developing a plant designed to supply 300,000 horse power. The Ontario Power Co. is a real competitor, and, it is stated, will expend \$2,000,000 in developing its plant. The scheme is to build a hydraulic canal from the Welland river, near the falls, to the bluff back of the Dufferin islands, where it is expected to develop 30,000 horse power. Thence the water will be conveyed by a second canal through Victoria park to a point below Table Rock, where a descent of 175 feet is expected to supply over 100,000 horse power. It is expected that the company will be able to supply 30,000 horse power within two years. The Lackawanna Steel & Iron Co. of South Buffalo and other contemplated industries will be supplied with power by the Ontario company, and thus, it appears, Buffalo will be the first to reap the advantages afforded by the development of this mighty power. Eventually the towns and cities in the province of Ontario will be supplied, Toronto to be included.

The officers of the Ontario Power Co. are as follows: President, John J. Albright, Buffalo; vice president and general manager, Gen. George S. Field, Buffalo; secretary and treasurer, Robert C. Board, Buffalo. The directorate consists of the officers named and Edmund Hayes, Buffalo; Franklin D. Locke, Buffalo; Robert Paine, Niagara Falls, Ont.; Henry C. Symmes, Niagara Falls, Ont.; Arthur C. Denniston, Philadelphia; William Germain, M. P. P., Welland, Ont.

J. M. Fordyce of Detroit has secured permission to experiment with electric propulsion of canal boats on the Miami canal. He will be permitted to select a stretch of 10 miles in the vicinity of Toledo on which to construct his apparatus. He must begin within one year, and two and a half years' time is allowed for the experimenting to be made. If desirable results can be demonstrated he is to be given the right to operate his boats on the canal between Cincinnati and Dayton for twenty-five years, paying the regular tolls for the privilege.

SHORT OF MEN FOR THE SHIPS.

The navy department was under the necessity last week of ordering the United States cruiser Detroit to the Portsmouth navy yard (N. H.) to go out of commission. In addition, orders have been prepared to put the Marblehead out of commission at Mare island, and telegraph orders have been sent to Admiral Watson to send the gunboats Bennington and Concord, now at Manila, home to San Francisco, where they will also be put out of commission. The big battleships Indiana and Massachusetts, which have just been overhauled at the New York navy yard, are also to be sent to League island about the first of the month to be laid up in ordinary instead of being commissioned.

This remarkable reduction of the number of ships in commission is ascribed at the navy department to the lack of a sufficient number of officers to furnish complements for the ships absolutely required for naval purposes. The battleship Kearsarge has just been put in commission, and the Illinois on the Atlantic side and the Wisconsin on the Pacific coast must also be commissioned immediately, in order that the ships can be taken over from the hands of the contractors. Then there are some smaller craft, like the Stringham and the Chesapeake, also calling for commissions and crews. The extent of the shortage may be suggested by the fact that for all of the four great guns in the double turrets of the new battleship Kearsarge but one officer could be spared, involving undue risk, even in times of peace. The navigation bureau is authority for the statement that there are fully 160 vacancies in the line of the navy and the total number of officers is really less than it was fifteen years ago, notwithstanding the great increase in the number of ships. The projected shortening of the course at Annapolis, provided for in the pending naval bill, would not substantially relieve the situation in less than fifteen years, so the officials are striving to find some method for temporary relief, such perhaps as the graduation of the Annapolis classes for the next two years one year in advance of the usual time, or an authorization for the immediate appointment to Annapolis of about a hundred extra cadets.

INSTRUCTIONS TO STEAMBOAT INSPECTORS.

Supervising Inspector General James A. Dumont of the steamboat inspection service has sent the following circulars to all supervising and local inspectors:

"Inspectors of steamboats will when they have reason to believe the law has been violated by any persons applying for license as master, mate, pilot, or engineer of vessels, or that any such officer has changed the terms of his license without authority, notify the United States attorney of the district for prosecution." The text of the act relating to this matter, which was approved March 23, 1900, and is now in effect, is as follows:

"Every applicant for license as either master, mate, pilot or engineer under the provisions of this title shall make and subscribe to an oath or affirmation before one of the inspectors referred to in this title to the truth of all statements set forth in his application for such license. Any person who shall make or subscribe to any oath or affirmation authorized in this title and knowing the same to be false shall be deemed guilty of perjury. Every licensed master, mate, pilot or engineer who shall change, by addition, interpolation or erasure of any kind any certificate or license issued by any inspector or inspectors referred to in this title shall, for every such offense, upon conviction be punished by a fine of not more than \$500 or by imprisonment at hard labor for a term not exceeding three years."

CONTRACT FOR THE HOLLAND.

The contract for the purchase of the submarine torpedo boat Holland from the Holland Submarine Torpedo Boat Co. has been definitely concluded. The boat becomes the property of the government for \$150,000, but the government will deposit \$90,000 of that amount with August Belmont & Co. of New York in trust for the Holland company as a guarantee that the government will suffer no loss for the money it advanced for the construction of the Plunger. The money deposited with Belmont & Co. will be paid to the Holland company when the Plunger has been accepted by the secretary of the navy. The contract gives the government the right to purchase the patents of the Holland submarine craft at any time and provides for the appointment of a board, to consist of two naval officers and one representative of the Holland company, to fix the price of the patent rights should the government decide to buy them. The company binds itself to furnish other boats similar to the Holland should the government want them, the price of each to be agreed upon later, but not to exceed \$170,000. It agrees also to provide a crew for a reasonable length of time to instruct naval officers and seamen in operating the Holland.

STEEL SHIP BUILDING WORKS IN CANADA.

Samuel C. Brookfield of Halifax is endeavoring to interest a number of Canadian and American capitalists in a project for establishing in that city large steel ship building works. It is understood that leading members of the Dominion Iron & Steel Co. have been approached with a view to enlisting their financial interest in the enterprise. Such an industry would consume the iron and steel produced at their Sidney works. The probable capital of the company is placed at \$20,000,000. Nova Scotia has never been reconciled to the loss of the great ship building industry that once flourished in its numerous ports, an industry which perished when iron and steel took the place of wood. That a ship building plant will eventually be a development of Canadian enterprise is a certain sequence of the iron and steel industries. Sydney, Halifax, and Dartmouth are spoken of as locations for the works.

TRIPLE SCREW FRENCH SHIP.

The navy department has been informed that the French government has just succeeded in the construction of a cruiser on the plan of the United States ship Columbia, using the triple-screw system. The first trials of the ship were unsatisfactory, but when changes in details were made upon suggestions solicited from Washington this cruiser, the Gulchen, succeeded in making the run from Toulon to Brest, a distance of 1,633 miles at an average speed of 18.57 knots per hour. This speed is slightly behind the Columbia's record for the famous trans-Atlantic cruise made by that ship, but is regarded as satisfactory in view of the length of the Gulchen's cruise.

AROUND THE GREAT LAKES.

The light-house board has transmitted to congress an estimate for an auxiliary steam steel light-vessel for Martin's Reef, Lake Huron, and an estimate for a light-ship for Grosse Point, Mich.

Senator McMillan has asked congress to amend the agricultural appropriation bill by allowing \$15,000 for a telephone line between Glen Haven and South Manitou island, in order that a signal station can be established on the island by the weather department.

The old West Shore dock on the ship-canal opposite the Great Northern elevator at Buffalo is to be rebuilt at once and converted into an ore receiving dock. The New York Central & Hudson River Railway Co. owns the property. The docks will be 620 feet long and 26 feet wide.

Frank E. Kirby has prepared plans for a new ferry for the Detroit, Belle Isle & Windsor Ferry Co., to run between Amherstburg and Bois Blanc island, Detroit river. The new boat will be 70 feet long and 20 feet beam and will be so constructed as to be used for towing and ferry purposes. She will be called the Pappoose.

Although it was announced that the docks at Buffalo would charge 25 cents a ton for unloading ore this season, the indications are that the charge at that port will be the same as at all other Lake Erie ports, which is 22 cents a ton. The manager of the D., L. & W. dock at Buffalo has sent out a circular to the effect that until further notice the charge for unloading ore on that dock will be 22 cents a ton.

The wooden steamer P. P. Pratt, first vessel to go up the lakes from Lake Erie this spring, is certainly in as good condition as any of the first fleet to cope with ice that may be encountered. After a thorough overhauling during the winter she was given a rating of 100, the best that is accorded in lake registration, and the inspectors laid special stress on the careful manner in which the work had been looked after by W. H. Mack, who is in charge of the Pratt.

James Graham, who operates extensive coal docks for the supply of fuel to steamboats just below the crowded ferry portion of the Detroit river, has been calling on vessel owners in different parts of the lakes recently in preparation for another season's business. He is not particularly disturbed on account of the consolidations in the coal trade. He says he is getting his share of the steamboat fuel trade and will very probably continue to get it on account of the favorable location of his dock and the constant effort that is made to satisfy the steamboat captains who patronize it.

George W. Johnson has been promoted to the position of superintendent of the Great Lakes Towing Co.'s fleet at Buffalo. He was with Hand & Johnson for eight years, and last year was bookkeeper and cashier under the new management. John Johnson has been appointed bookkeeper and cashier and has Alfred Smith for assistant. The fleet of the Great Lakes company this season for Buffalo and Tonawanda is as follows: Buffalo tugs—G. F. Dunbar, Cascade, Fabian, S. W. Gee, R. H. Hebard, Conneaut, Acme, O. W. Cheney, Grace Danforth, W. I. Babcock, James Byers, Alpha, W. H. Gratwick, John Kelderhouse, Welcome, James Martin. Tonawanda tugs—Tonawanda, C. S. Parnell, De Graff, A. A. Bellinger, Michael Davitt.

SEEKING GOVERNMENT AID FOR LIGHTS.

Secretary Keep and Treasurer McKay of the Lake Carriers' Association are still working with the United States light-house board in an effort to have the government relieve the association as far as possible from expenses of private lighting. It will very probably be found when vessels begin to move through Lake St. Clair and the St. Clair river that additional gas buoys in that locality will have greatly improved the lighting this season, and it is hoped also that before the season is very far advanced some of the private lights in the Sault river will also be replaced by gas buoys, but there is still the question of lights in Canada, both on the Detroit and St. Mary's river, that can not be hurriedly disposed of. The Lake Carriers' officials feel that as the lights are necessary for the navigation of channels constructed or partially constructed by the United States government, they should be paid for by the government until such time as permanent lights are provided. This could be done either through contract with the Lake Carriers' Association or with the light keepers themselves. It is on the score of payment for these lights that Secretary Keep and Capt. McKay are now making an effort with the Washington board. They are also urging the construction of another light-house tender for lake service.

SPEED IN TOLEDO STRAIGHT CHANNEL.

Under date of Sept. 29, 1899, Col. Jared A. Smith, United States engineer, acting under authority from the war department, amended the rules and regulations for the government of the straight channel through Maumee bay, Toledo, O., so that the speed allowance is ten miles an hour instead of eight. The speed of eight miles per hour, heretofore called for, proved to be somewhat of a hardship to vessels but they can probably reduce to ten miles an hour without special inconvenience. At the regulation speed of ten miles per hour, which equals six minutes per mile, the time allowance in passage is as follows:

From outer can buoys Nos. 1 and 2 to main crib.	.31-3 miles	20 minutes
From main crib to black spar No. 23.	.2¼ miles,	13¼ minutes
From black spar No. 23 to inner red can No. 34.	.2¼ miles,	13¼ minutes
Total		46½ minutes

Wm. T. Blunt is the assistant United States engineer in charge of this channel.

CRUISE OF THE BUFFALO.

Plans for the cruise of the training ship Buffalo are now completed. The training ship has just left the Brooklyn navy yard with sixty men from the receiving ship Vermont. She will proceed to League island navy yard where ninety men will be taken aboard and forty more at the Norfolk navy yard. These men will be fitted to become first-class seamen and will be assigned to the vessels now in ordinary. The itinerary of the Buffalo includes the Azores, Gibraltar, Lisbon, Gravesend, Christiania, Copenhagen, Stockholm, Kiel and Havre or Rouen.

HARRISON'S VIEWS ON SUBSIDIES.

It has just been discovered that on April 18, 1891, President Harrison made an address before a club in Galveston, Texas, in advocacy of a measure for the stimulation of American commerce. This is quite interesting, now that the shipping bill has been reported to the house with an admirable majority report upon it. Harrison's arguments are as sound today as they were the day upon which they were delivered. Among other things he said:

"We are rich enough and great enough to reach forward to grander conceptions than have entered the minds of some of our statesmen in the past. If you are content, I am not, that the nations of Europe shall absorb nearly the entire commerce of these sister republics that lie south of us. It is naturally in large measure ours—ours by neighborhood, ours by nearness of access, ours by that sympathy which binds an empire without a king. We shall need American steamships to carry American goods to these ports. Some say we ought not to go into this business, that it is subsidy. But, my friends, every other great nation of the world has been doing it and is doing it today. Great Britain and France have built up their great steamship lines by government aid and it seems to me our reference to that is amply portrayed by an illustration I used the other day. In olden times no wholesale merchant sent out traveling men to solicit custom, but he stood in his own store and waited for his customers. But presently some enterprising merchant began to send out men with their samples, to seek the trade, to save the country buyer the cost of the trip from New York or Philadelphia, until finally that practice has become universal. A merchant must adopt the new methods or go out of business. We have been refusing to adopt the universal methods of our competitors in commerce to stimulate their shipping interests and have gone out of business."

The shipping bill in its amended form will doubtless again be heard of in a forcible way, as it is more than probable that it will pass the senate by a large majority of the votes of that body.

NEW WORKS OF THE BERLIN COMPANY.

The Berlin Iron Bridge Co. of East Berlin, Conn., has made an extensive purchase of real estate at Pittsburg, Pa., and has already started on the plant to be located at that point. They have bought fifty acres of land between the Pennsylvania railroad and the Ohio river, upon which they will locate their plant, and in addition fifty acres back from the river. Upon this latter piece they will put up a number of houses for the use of their employees. Foundations for the buildings are now being put in place, and it is the intention that this plant will be in complete operation by July 1, as the orders for the machinery have been placed for some months.

The office building will be 60 feet square and four stories in height, and will be a fireproof structure throughout. The template shop will be 60 feet in width and 300 feet in length, two stories in height. The main shop will be constructed entirely of steel and glass, and will be 220 feet in width and 700 feet in length. The entire plant will be equipped with new machinery, which will be of the heaviest and most modern design. Orders for this machinery have been placed with the Hilles & Jones Co. of Wilmington, Del., Cleveland Punch & Shear Works Co. of Cleveland, Niles Tool Works of Hamilton, and the Brown Hoisting & Conveying Machine Co. of Cleveland. The hydraulic plant will be very elaborate, and will be furnished by Wm. H. Wood of Media, Pa. The floor surface of the main shop is to be controlled by twenty-three traveling cranes of various sizes and design and of the heaviest capacity, all furnished by the Chisholm & Moore Mfg. Co. of Cleveland. The fuel used will be natural gas, the engines being furnished by the National Meter Co. of New York. The machinery will be operated throughout by electricity, the generators and motors furnished by the General Electric and Westinghouse companies.

The Berlin company has a very large experience, extending over long years, in designing and building manufacturing plants, and they intend that this, their own plant, shall be the most perfect and complete of its kind in the world. No pains or expense have been spared in making it such, and the company is now taking contracts to be executed at these works after July 1. The capacity will be from 3,000 to 4,000 tons per month.

CARNEGIE CO.'S NEW MERCHANT MILL.

The Carnegie Steel Co. of Pittsburg have decided to put up a new merchant mill at the Duquesne Steel Works, Duquesne, Pa., which it is understood will be the largest of its kind in the United States. The mill will enable the company to compete for the trade of large agricultural implements such as are made by the McCormick Harvesting Machine Co. of Chicago, and the Deering Harvester Machine Co. The building will be 150 by 600 feet in size and there will also be a large boiler house and other subsidiary buildings. The plant is to be erected on the Athletic park property near Oliver station. Contracts for some of the machinery and other necessary apparatus have already been let. The company has had under construction for some time at Duquesne a new open hearth plant to contain fourteen 50-ton furnaces and a very large blooming mill and a billet mill to roll billets down to 1½ inches square.

NAVAL POLICY BOARD'S FIRST MEETING.

The naval policy board held its first meeting at the navy department on Monday of this week and elected Lieut. H. H. Ward of the bureau of navigation as its secretary. The utmost secrecy was maintained and it was announced to the press that, from its very nature, the board would never have any of its proceedings to impart to the public. All of the members of the board were present including Admiral Dewey; Rear Admiral A. S. Crowninshield, chief of the bureau of navigation; Capt. C. H. Stockton, president of the naval war college; Capt. Asa Walker, principal assistant in the naval war college; Capt. Charles D. Sigsbee, chief intelligence office, and Lieut. Commander R. T. Mulligan, principal assistant in the intelligence office; Capt. H. C. Taylor, C. E. Clark, R. D. Evans, and F. E. Chadwick, and Col. G. C. Reid, general inspector of the marine corps.

The citizens of Albany will give a silver service worth \$3,500 to the cruiser Albany.

FUNERAL OF THE LATE CAPT. THOMAS WILSON.

Simple as his life and impressive as his character were the funeral services for the late Capt. Thomas Wilson, in Cleveland, Wednesday afternoon. The family residence at No. 2198 Euclid avenue was crowded with those who had come from far and near to pay the last tribute to the dead. The floral offerings were beautiful. Rev. Caspar W. Hiatt of the Euclid avenue Congregational church officiated at the services, assisted by Rev. F. C. Ottman of Newark, N. J., and Chaplain Jones of the Floating Bethel. Briefly and eloquently they reviewed the life which had been active in business, philanthropic and church circles.

The remains were interred at Lake View cemetery, the following gentlemen acting as honorary and active pallbearers: Honorary—W. C. Farrington, Buffalo; Capt. Alexander McDougall, Duluth; J. W. Westcott, Detroit; Capt. William Forbes, Port Huron; Capt. J. G. Keith, Chicago; Charles Beatty, Buffalo; William Chisholm, Sr., Justin Snow, Horace Ford, Capt. George P. McKay, W. D. Rees, E. W. Oglebay, Cleveland. Active—Hon. John H. Farley, George L. Quayle, J. E. Upson, J. J. Sullivan, H. D. Goulder, H. A. Hawgood, B. L. Pennington, T. Spencer Knight, J. W. Moore, H. Clark Ford, H. P. McIntosh and Capt. Edward Morton, all of Cleveland.

The flags upon all vessels in the harbor were placed at half mast and many of the offices of the vesselmen were closed. Among the vesselmen from other cities present were: W. C. Farrington of Buffalo, president of the Lake Carriers' Association; Capt. J. G. Keith of Chicago, first vice-president of the Lake Carriers' Association; Capt. Alexander McDougall of Duluth, Capt. William Forbes of Port Huron, Capt. J. W. Westcott of Detroit, C. D. Carpenter of Port Huron, James Ash, George W. Bone and Capt. J. J. H. Brown of Buffalo.

The tribute of the Lake Carriers' Association, prepared by a committee consisting of H. Coulby, B. L. Pennington, J. J. H. Brown and Harvey D. Goulder, is as follows:

"The news of the death of Captain Thomas Wilson, like a thunderbolt from a clear sky, came as a surprise and a severe shock to his many friends throughout the chain of lakes. It smote all with a keen sense of sorrow for the irreparable loss.

"Thomas Wilson was a man of strong personality. He was dominated by reason rather than by sentiment or impulse and he had the courage of his convictions. He was a man of more than ordinary sagacity and foresight. His integrity was unquestioned. His benevolence was unflinching and he gave without ostentation. Having committed himself to particular charities or institutions he deemed worthy, his interest in them never waned, his financial support never flagged. He had hosts of friends and stood by them always with fraternity and loyalty. He was a man of correct personal habits. Nothing could swerve him from the course of conduct he had chosen as proper and right for him. A consistent Christian, strenuous for correct doctrine, he never obtruded his profession but exemplified it in his life. As a citizen he was public-spirited and patriotic. He conscientiously did his part in endeavoring to secure good government and just laws, especially the enactment of laws to promote the cause of temperance. He was a devoted husband, an indulgent father, a steadfast friend. If universal sorrow is any measure of his worth, an irretrievable loss has been sustained in his death.

"His counsels as president of the Lake Carriers' Association, and later as a member of the executive committee, were always wise and helpful; and to him perhaps as much as to any other, we may attribute the success of the association.

"As members of the executive committee we adopt this memorial tendering our sincere sympathy and condolence to the afflicted family in their great bereavement and during the long, sad journey homeward. May the consolations that Heaven alone can give be abundantly bestowed upon the multitude who mourn his loss.

"We direct that this memorial be spread upon the records of the association and that an engrossed copy be presented to the bereaved family."

ICE-BREAKERS IN THE ARCTIC SEAS.

In an article on the performances of Admiral Makaroff's gigantic ice-breaker Yarmack last summer, one of the Hamburg journals, contends that the result proves that science has not yet succeeded in producing a steam vessel competent to force her way through really thick Polar ice. We know that Makaroff's belief was that with an ice-breaker such as he was building he would be able to keep navigation to and from Siberia open for a much longer time every year, but the gallant admiral has had to confess himself beaten. The Yarmack, it will be remembered, built by Armstrong at Newcastle, England, at the price of 1,500,000 roubles, proceeded to St. Petersburg at the beginning of the spring of 1899, and along certain parts of the Russian coast she had to force her way through ice 2 to 3 feet in thickness. Of course there was nothing extraordinary about this. The ice-breaker Nadeschny, built in 1896 at Copenhagen for service at Vladivostok, with a horse power of 3,400 (the four engines of the Yarmack have an aggregate of 10,000 horse power), at her trial trip in February, 1897, near Port Baltic at the entrance to the Gulf of Finland, made her way through ice 6 metres thick, and better things than even this have been done by the ice-breaking steam ferries regularly working across straits of the great American lakes.

ACTION UPON WAGE SCHEDULE POSTPONED.

The executive committee of the Lake Carriers' Association met in the offices of M. A. Hanna & Co., on Thursday morning to decide upon the wages of all men aboard vessels, but after some discussion it was concluded to postpone final action until all the vessel interests along the lakes could be represented at the meeting.

The British torpedo boat Destroyer Virago came over from the Esquimaux naval station at a thirty-two-mile-an-hour clip on April 3 to Vancouver, B. C., making the trip from Esquimaux in the record-breaking time of less than two and a half hours. The run was made in the effort to catch a deserting paymaster.

The annual report of W. Bell Dawson, the engineer in charge of the survey of tides and currents in Canadian waters has just been issued in pamphlet form by W. P. Anderson, chief engineer of the department of marine and fisheries. The report is valuable and comprehensive.

MASTERS AND ENGINEERS.

APPOINTMENTS OF OFFICERS FOR SHIPS OF THE GREAT LAKES,
SEASON OF 1900.

Bessemer Steamship Co., Cleveland: Steamers—J. B. Neilson, Capt. W. J. Hunt, Engineer W. B. Roach; Henry Cort, Capt. Frank Rice, Engineer W. J. Gervin; James B. Eads, Capt. R. E. Byrns, Engineer G. A. Miller; John Ericsson, Capt. W. S. Hoag, Engineer L. D. Weeks; Robert Fulton, Capt. S. C. Allen, Engineer J. B. Heyward; Sir William Fairbairn, Capt. James Driscoll, Engineer A. P. Williams; George Stephenson, Capt. A. C. Chapman, Engineer J. L. Walker; James Watt, Capt. F. W. Stenton, Engineer A. W. Arnson; Sir Henry Bessemer, Capt. John Ward, Engineer R. Masten; Sir William Siemens, Capt. Harry Gundersen, Engineer D. McGilvery; S. F. B. Morse, Capt. E. M. Smith, Engineer E. W. Fox; Douglass Houghton, Capt. Henry Stone, Engineer J. W. McEchern; Gen. O. M. Poe, Capt. John Lowe, Engineer F. H. Warner; Colgate Hoyt, Capt. Neil Campbell, Engineer Frank Harringer; J. L. Colby, Capt. Peter Peterson, Engineer William Densmore; E. B. Bartlett, Capt. M. C. Cameron, Engineer J. J. Norcross; A. D. Thomson, Capt. H. F. Loftus, Engineer William Young; Thomas Wilson, Capt. C. D. Secord, Engineer A. J. Smith; Samuel Mather, Capt. John Park, Engineer Alex. McKenzie; J. B. Trevor, Capt. John Dunn, Engineer Walter Harsant; Frank Rockefeller, Capt. M. C. Boyce, Engineer J. H. Pierce; Alex. McDougall, Capt. W. H. Kilby, Engineer Irwin Marshall; J. B. Colgate, Capt. Charles Grant, Engineer H. Folkert; R. E. Bunson, Capt. W. H. Campau, Engineer S. W. Armstrong; C. E. Van Hise, Capt. C. E. Moody, Engineer ———. Barges—John Scott Russell, Capt. W. H. McDonald; Sir Joseph Whitworth, Capt. Peter Gustafsen; Alexander Holley, Capt. O. W. Holdridge; George H. Corliss, Capt. G. L. Durand; Alfred Krupp, Capt. Arnold Nordahl; James Nasmyth, Capt. W. H. Dick; Sir Isaac L. Bell, Capt. E. L. Sawyer; W. L. Jenney, Capt. F. S. Fear; Sidney G. Thomas, Capt. M. Langel; John Fritz, Capt. A. McArthur; John A. Roebbing, Capt. F. E. Ingraham; John Smeaton, Capt. H. A. Byrns. Other captains engaged but not assigned: Louis Leonard, Samuel Durfee, E. E. Manuelson, Donald Graham, Robert Thompson, R. W. Gleason, A. Siljander, Charles Mulholland, Daniel McFadgen, John Sprowell, Robert Brooks, James Burr, C. N. Noble, A. A. Boyce, Willard Damon, J. W. Norcross, H. Harris, Jr., Edward Morey, and D. J. Barron. These captains unassigned are for 105, 107, 109, 110, 111, 116, 117, 118, 126, 127, 129, 130, 131, 132, 133, 134, 137, 201, 202.

Corrigan, James, Managing Owner, Cleveland: Steamers—Bulgaria, Capt. F. C. Hart, Engineer Wallace Lockhart; Caledonia, Capt. Robert Donaldson, Engineer E. Sampson; Italia, Capt. John McArthur, Engineer Thomas McDonough; J. Emory Owen, Capt. J. W. Brion, Engineer P. J. Navaugh; Robert Wallace, Capt. Frank D. Perew, Engineer Frank Perew; Quito, Capt. Fred Chalcraft, Engineer J. H. Smith; Iron Age, Capt. J. A. Nicholson, Engineer Fred Craig; Iron Duke, Capt. N. L. Miner, Engineer Irwin Morrison; Iron Chief, Capt. W. A. Irvine, Engineer August Cobo; Progress, Capt. W. C. Goodsell, Engineer J. Williams; M. M. Drake, Capt. J. W. Nicholson, Engineer C. Mugkelburg; Minnesota, Capt. F. B. Cody, Engineer F. McKinney; St. Paul, Capt. Ed. Rains, Engineer John Radford. Schooners—Tasmania, Capt. John Weeks; Amazon, Capt. Robert DeLong; Australia, Capt. Harvey Peters; Polynesia, Capt. A. J. McKay; Iron Cliff, Capt. Martin Kurth; F. D. Ewen, Capt. M. D. Pridgeon; Michigan, Capt. McArthur; Ashland, Capt. M. S. Cody; J. M. Hutchinson, Capt. H. Holland; J. I. Case, Capt. Sam Gould; R. Halloran, Capt. C. H. Marsden.

Minch & Nicholas Transportation companies, Wm. Gerlach, Mngr., Cleveland: Steamers—I. W. Nicholas, Capt. N. B. Nelson, Engineer Wm. H. Miller; Onoko, Capt. Joseph Lampoh, Engineer E. A. Meeker; Wm. Chisholm, Capt. Wm. Carlross, Engineer Geo. Milne; John N. Glidden, Capt. H. H. Hinslea, Engineer John Miller. Schooner—Dundee, Capt. Martin Elnen.

West Division Steamship Co., W. H. Wolf, president, 236 Oneida street, Milwaukee, Wis.: Steamers—Fred Pabst, Capt. Daniel C. Sullivan, Engineer Mr. Mason; W. H. Wolf, Capt. Wm. Lund, Engineer Thos. Allbrighton. Schooner—Armenia, Capt. Frank Brown.

Corrigan, John, Cleveland: Steamer—Aurania, Capt. B. H. Jones, Engineer J. Cummings.

DOCK PROPERTY OF THE PITTSBURG COMPANY.

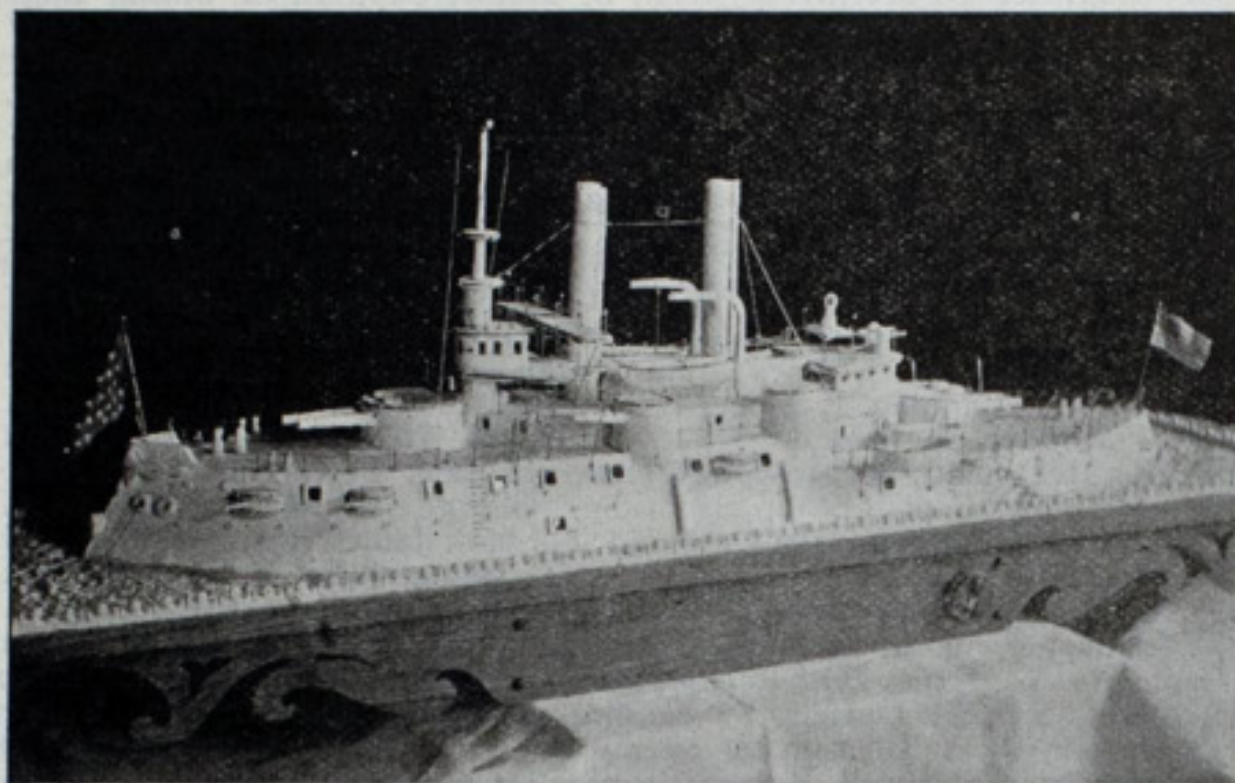
Operations of the Pittsburg Coal Co. (big bituminous consolidation) on the great lakes are certainly of a very extensive kind. Their facilities and the dock interests which they control are best shown by reference to the property that is under the direction of John A. Donaldson of Cleveland, manager of docks and fueling department. A single car dumper, one of the great modern machines that takes up a car of coal and dumps it into the hold of a vessel, loading a whole cargo of 3,000 to 6,000 tons in about a day, is in itself a property of no small proportions. There are no less than seven of these owned by the Pittsburg Coal Co. at Erie, Ashabula, Fairport and Cleveland on Lake Erie. The dock interests in the department managed by Mr. Donaldson include four car dumpers and three steamboat fuel lighters at Cleveland; one car dumper and a lighter at Fairport; one car dumper and a lighter at Ashabula; a car dumper and fuel pockets at Erie; docks and pockets at Sandwich and Amherstburg on the Detroit river; docks and pockets at Detour on the Sault river and also at Sault Ste. Marie, the latter of which was formerly the property of the Port Royal Dock Co.

But after all the great volume of business that will be represented in coal going over these docks during the season of navigation now opening is only a small part of the operations of the consolidation known as the Pittsburg Coal Co. Its sales of coal in the manufacturing district of Pittsburg alone are more important than the lake business.

Mr. Eugene Tyler Chamberlain, commissioner of navigation, and Mrs. Mary Lee Chapman were married very quietly at the rectory of St. Paul's Episcopal church, Washington, D. C., on Tuesday, by the rector, the Rev. Alfred Harding. The announcement came as a surprise to his many friends. Mr. Chamberlain is a club man and is one of the most active members of the Metropolitan club.

THE BATTLESHIP IOWA IN CAKE.

The Creve Coeur club of Peoria, Ill., presented to Capt. Robley D. Evans at its annual banquet a few weeks since a model in cake of the battleship Iowa, which "Fighting Bob" commanded in the battle off Santiago. Both captain and guests were completely surprised when the beautiful model was carried into the banquet room with every light ablaze. The model is built entirely of cake and confectionery. This remarkably correct and artistic creation is a wonderful piece of work. The hull from the waterline to the gun deck is composed of white fruit cake, 56 inches long and 11½ inches beam at waterline. The gun deck from the fore to aft turrets is of pound cake, the turrets, funnels, guns, cabin, bridge and all detail work of confectionery, all iced a snow white and trimmed with rolled gold and sterling silver chains and tape; weight 71½ pounds, mounted on an oak board of 1 by 16 by 66 inches, the uncovered margin



MODEL OF THE BATTLESHIP IOWA IN CAKE.

of board being heavily iced with water-colored icing. This board rests on a scrolled base 4 inches high, in the center of which an electric battery, composed of six cells of 1,900 open circuit batteries, are stored, producing the light in the cabin and the searchlight aft, which can be turned on at will. These lamps are without sockets and are molded into gum paste pedestals as wanted.

The boat was made after photograph and deck plan supplied by the assistant secretary of the navy and is built on a scale where possible of ¼ inch to the foot. The body of the boat as a cake is exceptionally fine and will keep for years, being well iced and enclosed in a plate glass case. The silver plate on the after deck bears this inscription:

"Presented to Capt. Robley D. Evans, U. S. N., by the Creve Coeur Club, Peoria, at its second annual banquet, Washington's birthday, 1900. Designed and made by John L. Blocher, superintendent." The model is now at Capt. Evans' home, No. 324 Indiana avenue, Washington, D. C.

ANOTHER LAKE AND RAIL PROJECT.

Another lake and rail line of a kind similar to the Canada Atlantic line, which now operates between Chicago and Montreal and Georgian bay to Parry Sound and thence by rail, is talked of in Canada. Among the incorporators named in dealings with the Canadian government are J. G. Keith, vessel owner and agent of Chicago, Frederick Kraus, a grain dealer of Milwaukee, and George F. Piper of Minneapolis, one of the promoters of the American Linseed Oil Co. Canada National Railway & Transport Co. is the name of the new corporation and the route proposed from the Georgian bay, where vessels would deliver freight from upper lake ports, is via Collingwood and Toronto. The Collingwood-Toronto connection of ninety-five miles will be an air line and it is claimed that the new company will have the shortest route between points on the great lakes and Montreal, with a minimum of rail and a maximum of water haul. The route proposed will, of course, avoid the Welland canal and the long haul through St. Clair and Detroit rivers and Lake Erie. The incorporators of the company are: John Wilson, Fred T. Hodgson and David Wilson of Collingwood, J. G. Keith of Chicago, Frederick Kraus of Milwaukee, G. G. Barnum and William Buchanan of Duluth, G. F. Piper of Minneapolis, George H. Breyman of Toledo, R. C. Stewart, John H. Boyle and J. B. McCall of Toronto, W. J. Hill of Deer Park, Ont., and G. P. Graham of Brockville, Ont. The capital stock is fixed at \$5,000,000 and the company headquarters are to be located in Toronto. A bill which is now before the Canadian parliament authorizes the company to acquire property for docks, elevators and tramways in connection with its railway, and to construct and operate telegraph and telephone lines along the railway to be used in connection with the road and docks. The company may issue bonds, debentures or other securities to the extent of \$40,000 per mile of the railway and to the extent of two-thirds of the cost of such docks, elevators, telegraph and telephone lines, and may also receive aid from any government, person or municipal corporation in the construction of its line.

SENATE PASSES THE CABLE BILL.

The senate has passed the substitute Pacific cable bill, a measure appropriating \$3,000,000 for the construction of a cable line between San Francisco and Honolulu. The bill provides that the work shall be done under the supervision of the navy department, which has made surveys and determined the practicability of the route. The navy may use any of its ships that can be adapted to the task of laying the cable and if it needs others it may charter them. In addition it provides that the secretary of the navy, in his discretion, if he finds that it is not practicable to lay the cable by the force of his own department, may contract for laying it. All materials and appurtenances are to be of American manufacture.

SHIP BUILDING ON THE PACIFIC COAST.

The San Francisco Call in discussing the fact that the Risdon Iron & Locomotive Works of that city intends to engage in ship building says:

"The purchase by the Risdon Iron Works of the ship building plant of the Pacific Rolling Mills probably presages the organization in this city of another large ship yard, with its consequent advantages to the coast. The property in question is immediately east of the yard of the Union Iron Works, and has 1,700 feet of the water front, with facilities for accommodating vessels of any draught. The land comprises thirty-two acres, and with a small expenditure the buildings now standing may be utilized for ship building purposes. It is said to be a part of the plan of the Risdon Iron Works to construct a dry dock and thoroughly equip the establishment for the construction of modern vessels of all kinds, including men-of-war. To appreciate thoroughly the significance of this enterprise it is only necessary to consider for a moment the effect which has been produced upon the state by the operations of the Union Iron Works during a period of about fifteen years. That establishment has not only constructed one of the finest men-of-war ever built, but it has developed upon this coast a ship building industry that employs about 3,000 men and which constantly supports between 15,000 and 20,000 people. If the Risdon Iron Works establishes a similar ship yard not only will our shipping interests receive the benefits of competition, but the business will be greatly stimulated. The history of all such enterprises is that the greater the number of them the greater the demand for their products. The Union Iron Works has been largely supported by government contracts. If the Risdon company is able to build as good warships as those built by the Union Iron Works there will be no reason why a portion of the government patronage should not be conferred upon it."

ATLANTIC TRANSPORT CO.'S NEW MINNEAPOLIS.

The new twin-screw Atlantic Transport Co.'s steamer Minneapolis, Capt. Layland, which is exceeded in length only by the White Star liner Oceanic, arrived at New York April 9, from the yards of her builders, Harland & Wolff, at Belfast, Ireland. She is the first of four colossal passenger and cargo carriers that the line will have in service between New York and Liverpool within the next two years. Her sister ships will be called the Minnehaha, Minnetonka and Minnewaska. She measures 13,700 gross tons, is 650 feet long, of 65 feet beam and 44 feet depth of hold. She has accommodations amidships, above deck, for 250 cabin passengers. She will carry no second-cabin or steerage passengers. On her trial trip she made about 19 knots and her owners expect her to cover the 3,200 knots between London and New York in eight days. The best of the other ships of the line make the trip in ten days. She is the first passenger steamer that has ever come directly from the yards of her builders to New York in ballast and she will thus make her maiden voyage to London instead of to the westward.

THE SHIPPING BILL TO PASS THE SENATE.

The Republicans in the senate intend to put the shipping bill through that body during this session. Speaking on the subject in answer to an inquiry, Senator Frye, chairman of the committee which reported the bill, said:

"I should not like any better campaign work than speaking to the public on that measure. Let the people of the United States thoroughly understand what that bill will do for the country in general in promoting our foreign trade and in giving employment to the people in the United States, as well as in saving a part of the enormous sum we now annually pay to foreigners for doing our ocean carrying trade, and there will be no manner of doubt about their support of the measure. I observe that the English newspapers specially devoted to the shipping interests of that country are very anxious for fear that this measure will soon go on our statute books. Incidentally they concede that we just need such a law. And so we do, and we will have it in my opinion before long."

HAVANA'S FLOATING DRY DOCK.

The Spanish government has offered to sell the floating steel dry dock at Havana to the United States for the sum of \$200,000. The army now in control in Cuba has no use for the dock, so the negotiations have been carried on by the navy department. The dock, it is said, would be of much service to the navy, in view of the utter lack of any other large dry dock in the West Indian waters, and even if Cuba should be vacated by the United States government without retaining a naval station at Havana—which latter is a project cherished by many naval officers—the dock would still be of great value at the Pensacola naval station, which has only recently been discovered to be accessible to large ships, or at the splendid new station to be established at Dry Tortugas. The price asked by the Spanish government for the dock is, however, regarded as excessive, in view of the deterioration which has taken place in the structure, owing to neglect, and there must be further bargaining before the title passes.

LITTLE LETTERS FROM WASHINGTON OFFICIALS.

An item has been floating about that the transport Logan would represent the transport service of the war department at the Paris exposition. Col. Charles Bird, quartermaster in charge of the transport service, writes the Review that the department has no intention of sending the Logan to the exposition and that the transports are all too busy to be used for any purpose other than that for which they were fitted up.

Brigadier General M. I. Ludington, writing to the Review, says that the transport Sumner is not the finest transport of the fleet, as was represented in congress. He says that she is a comparatively small boat and fitted up pretty much on the same line as that of the other transports. "Exaggerated reports and remarks have been made in regard to this vessel," said he.

Rear Admiral Frederick Rodgers, president of the naval board of inspection and survey, writing to the Review, says: "I have not ventured an opinion as to the merits of the superimposed turrets. Further and more exhaustive trials will no doubt be made. The report of the board of inspection, which is in the hands of the navy department, referred more particularly to the structural strength of the ship and her appointments."

NEWS FROM BOTH COASTS.

ACTIVITY CONTINUES IN ALL OF THE SHIP YARDS AND A NUMBER OF THEM ARE MAKING IMPORTANT ADDITIONS TO THEIR WORKS.

George Gale is building at the Dutch Point shipyard, Hartford, Conn., coal barge No. 16 for the Hartford & New York Transportation Co. This barge is 186 feet 10 inches over all, 36 feet molded beam and 13 feet depth, and will draw 11½ feet loaded and 2½ feet light. Her capacity will be 1550 tons of hard coal. The material will be chiefly of southern pine. The bow and stern will be planked with native white oak. There will be five transverse bulkheads and a combing 3 feet high, covered with light hatch doors. The timbers will be very heavy, the floor timbers being 8 by 14, running to 8 inches at top height. The keel will be 6 by 12 and there will be fourteen keelsons, 12 by 12, the ones in the bilge 14 by 15 and side ceiling 6 inches thick. The planking will be bolted and tre-nailed. A shelf, 8 by 14, will extend around under the deck to strengthen the vessel. Her beams will be 14 by 14. Over the keelsons a plank floor 3 inches thick will be laid so as to permit of steam grapples being used for unloading, no shoveling being required. The cabin will be 7 feet above the deck and will be built of white pine finished with yellow pine. The vessel will be fitted with two anchors, one weighing 1,000 pounds and the other 1,200 pounds. Each will be fitted with 45 fathoms of 1½ and 1¼ stud link chain.

The four-masted schooner Calumet, built by Kelley, Spear & Co. of Bath, Me., for John S. Emery & Co. of Boston, was launched last Saturday. The Calumet is 180 feet keel, 40 feet breadth of beam, 18.6 inches depth of hold, with a poop 4 feet deep to extend 5 or 6 feet forward of the mainmast. The following firms will furnish some of the equipment: Sails, H. S. Lord & Co., Bath, Me.; chains, Lebanon Chain Works, Lebanon, Pa.; windlass, capstans and wrecking pumps, Hyde Windlass Co., Bath, Me.; anchors, W. G. Alden & Co., Camden, Me.; wire rigging, Washburn & Moen Manufacturing Co., Worcester, Mass.; blocks, Boston & Lockport Block Co.; boats, C. E. Leighton, Harrington, Me.

The ship building firm of Theodore E. Crane's Sons, Erie basin, Brooklyn, has under construction the following craft: Derrick barge for Lehigh Valley railway; finishing up the eighth barge for the New York Central & Hudson River railway; one barge for the Manhattan Lighterage Co.; barge for F. W. Jarvis & Co.; pontoon for the New York & South Brooklyn Ferry Co. They are also doing a large amount of repair work and overhauling, among which is a barge of Wright & Cobb's, four tugs for the New York Central, barge of the New Jersey Lighterage Co., barge of the New England Transportation line, and the ferryboat West Brooklyn.

It is announced that the Eastern Dock & Construction Co. of Boston has purchased about fifty acres of land at Quincy Neck, Mass., with something over a mile of water front, including a long stretch on the channel, with ample depth to launch the largest steamship afloat. As soon as the company receives assurances that the draw in the Quincy Point bridge will be widened to at least 80 feet and that certain facilities in the way of freight transportation will be granted by the city council it will begin the construction of wharves and workshops to accommodate 1,000 workmen. Mr. Frank E. Crane of Quincy negotiated the sales.

The United States army transport Crook, which was rebuilt at the Erie basin, Brooklyn, at a cost of \$250,000, is ready to resume her runs to Cuba and Porto Rico. Her teak deck houses have been replaced with steel ones. Her upper deck is flush from the turtle-back bow to the taff rail. Her engineers' quarters are situated on the upper deck aft and the rooms of her deck officers are on the bridge deck. She has been well fitted up for a number of passengers, and her engines, boilers and engine rooms have all the modern improvements.

The German steamer Wilhelm, which cleared at Philadelphia on April 9 for Yokohama and Vladivostok, carries one of the largest shipments of American machinery ever forwarded to the far east, being 6,600 tons in weight. The principal part of the cargo consists of thirty-one Baldwin locomotives for the Chinese Eastern railway, 2,000 tons of steel rails for the Formosa railway and 400 tons of bridge material for Japan. The cargo is valued at more than \$1,000,000.

Lieut. C. P. Hughes, U. S. N., who has been in charge of the branch hydrographic office at Philadelphia, and who has had as additional duties the inspection of equipment at the ship yards of the Cramps and Neafie & Levy at Philadelphia, and the Harlan & Hollingsworth Co. at Wilmington, Del., has been relieved of the latter duty and now by order of Washington devotes his entire time to the duties of the branch hydrographic office.

The Hamburg-American Packet Co.'s steamer Brigavia, which was badly damaged by striking a sunken obstruction in the Delaware Feb. 27, was floated from the dry dock at the League Island navy yard a week ago, after having repairs made to her by the Cramps aggregating \$25,000. She had no sooner got down into the river than she ran aground again and it took a number of tugs to pull her off.

John McInnis, who recently resigned his position with the Columbian Iron Works, is now with the Bath Iron Works as assistant superintendent in charge of hulls, excluding torpedo-boats. Charles P. Wetherbee is assistant superintendent in charge of torpedo-boats. Hugh Madden, the Bath Iron Works boiler maker, is in general charge of the ship yard, with Thomas Fairburn and Edward Tuck as assistants.

Arthur Sewall & Co., Bath, Me., are about to begin the construction of two large 3,000-ton steel shipentines somewhat similar to the Arthur Sewall and Edward Sewall. Plans for these ships, which are to be 335 feet long, 45 feet wide and 27 feet deep, have already been prepared by William A. Fairburn. Steel has been ordered and it is probable that the keels will be laid early in July.

Hirzel, Teztman & Co., agents at New York for the Navigazione Generale Italiana, announce that the line is building for service between Mediterranean and American ports five steel steamships of 6,000 tons. They will carry only seventy-five cabin passengers and 1,200 steerage passengers. The first ship will be put on the New York route next year.

The New York & Cuba Mail Co.'s steamship Morro Castle was launched from the Cramp ship yard on Saturday. She was christened by Miss Florence Cramp. The ship is 400 feet long, between perpendiculars,

50 feet beam, molded; 22 feet draught, loaded. Her displacement is 8,750 tons and she is designed for a speed of 18 knots per hour.

The Hartford & New York Transportation Co. has placed a contract with the Columbian Iron Works of Baltimore for a large seagoing tug to be used in its towing service. The tug will be 115 feet long by 24 feet beam and will draw 9 feet of water. She will be built of iron, will cost about \$65,000 and will be ready for delivery by Sept. 1.

The Hilles & Jones Co. of Wilmington, Del., has received an order from the Eastern Shipbuilding Co., New London, Conn., for a large part of their equipment, consisting of mast bending rolls, heavy plate bending and flanging roll, 28-foot planer, plate straightening rolls, and heavy vertical and horizontal punches and shears.

Percy & Small, wood ship builders of Bath, Me., are seriously considering the advisability of establishing a ship building plant for the construction of steel coasting schooners. This firm has built some of the finest four and five-masted wooden schooners in the country, and they have a most enviable reputation.

The official trial trip of the torpedo boat Stringham has been postponed. Rear Admiral Rodgers and other members of the inspection party failed to appear. On the builders' trial trip this boat made 30 knots an hour. She was built by the Harlan & Hollingsworth Co. of Wilmington, Del.

William C. Besselievre, assistant superintendent of the hull department of the Bath Iron Works, has accepted a government position as assistant inspector at the Cramp ship yard, Philadelphia. Mason S. Chase holds a similar position at the Newport News works, Newport News, Va.

F. H. Chappell of New London, Conn., is to establish a wood ship yard with marine railways at New London on property owned by the Thames Improvement Co., just above the railroad bridge. The land has already been bought and work will begin in the early summer.

At the Hyde Windlass Co.'s works, Bath, Me., a large force of men are engaged on the construction of two battleship windlasses for the Union Iron Works and on four of the largest windlasses the works have ever made for the William Cramp & Sons Co.

The American line, plying between Philadelphia and Liverpool, carried in March over twice the number of passengers during March that were carried in the same month last year, an increase almost unprecedented.

Neafie & Levy, Philadelphia, will build the machinery and Thomas McCosker & Co., Baltimore, the hull of a wooden tug 95 feet long, 21½ feet beam and 10½ feet deep for Philip Weaver & Son.

Messrs. D. D. Kelly & Son and Ambrose A. Martin of Boston are repairing the nautical training ship Enterprise. The work will take about two months.

T. M. Isham, Mystic, Conn., has contracted to build two three-masted schooners of 1,800 tons each and is negotiating for others.

Within a month the Russian battleship Variag, building at the Cramp works, Philadelphia, will be ready for her trial trip.

It is computed that the ship yards along the Delaware river have work on hand to the amount of \$25,000,000.

The light-house steamer John Rodgers has received a new boiler from Brown & Miller of Jersey City.

ALONG THE PACIFIC COAST.

A fine four-masted schooner for the Philippine trade was launched from Hay & Wright's ship yard at Alameda, Cal., last week. This makes the third vessel, and the keel of the fourth will soon be laid. This third schooner has been christened Luzon and the fourth will in all probability be called the Mindora. Hay & Wright are also building very substantial deck houses on the Alaska Packers' Association steamer Wigwag; also putting deck houses on the Francis Cutting for Hume Bros., and putting another deck on the Dora for the Alaska Commercial Co., while they have the steamer Celia on the marine ways giving her a thorough overhauling.

Crawford & Reid of Tacoma, Wash., launched a few days ago the new steamer they are building for Hunt Bros. This steamer is being built to take the place of the Victor, which was sold by them and will be converted into a tug by her new owners. The new steamer, which has not yet been christened, will run between Seattle and Tacoma. Her machinery will be installed in Tacoma.

W. A. Boole & Co. of San Francisco have leased waterways at Oakland, where they will set up three marine railways of large capacity, a ship yard and a large dry dock. The latter will be 100 feet in width by 800 feet in length.

ABOUT THAT STOVE?

In the general fitting out this spring many vessels will require new cooking apparatus, and all such cannot do better than send for illustrated circulars and prices of the Born steel ranges, especially built for ship use. Many of the finest vessels afloat are equipped with these ranges. They are substantial, convenient and easy to operate, and can be depended on for good work under all conditions. All the parts are extra heavy to stand rough usage. There are four sizes, with fire box between ovens, ranging in length from 4 feet to 6 feet, and having ovens from 16 inches wide to 26 inches. They are also made in sections with fire for each oven, and any combination will be furnished. Born's single oven ranges with rails and stanchions for boat use are also prime favorites. Top dimensions of these ranges are 43x33 inches, and the oven is 24 inches wide, 24 inches deep and 15 inches high. The tank holds about 18 gallons and is made of polished copper with rim extending above the lids so that cups, dishes, etc., may be placed on top for warming. Smaller or larger sizes with ovens varying in width from 17 to 36 inches and reservoir of any desired size may be had fitted up in the same way. They are also furnished without the tank and with high shelf, hot closet or water back.

The new factory of the Born Steel Range & Manufacturing Co. occupies four acres of ground, completely equipped with modern machinery and appliances. The general offices and storerooms occupy five stories and basement, 150 feet deep, at 122-126 Superior street, Cleveland, where a full line of family, hotel and ship ranges, steam tables, bake ovens, urns, etc., is displayed and where selections may be readily made at any time.

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A word about armor plate manufacture, which presently is to undergo discussion in the house of representatives. It is one thing to legislate to build an armor plate plant; it is another thing to establish and to maintain it as a commercial institution. No form of manufacturing is subject to such great changes which render obsolete plants of immense value to make necessary immediate changes involving the expenditure of vast sums. That is the reason why the firms which manufacture armor plate may be counted upon one's fingers. France has five firms, Great Britain has four, Germany has two and the United States has two—and that's all. What has been the history of these firms? The Carnegie and Bethlehem plants had expended \$4,000,000 upon their equipment to find that new processes and new conditions rendered imperative the employment of new machinery. Penetration was formerly prevented by thickness of armor; it is now prevented by hardness and toughness. A hard substance is rarely tough, but armor plate must possess these apparently contradictory qualities. It is palpable that as the armor plate, possessing these two qualities in a higher and higher degree becomes thinner and thinner, the price of it per ton must increase. The price must increase as the thickness diminishes, for it costs more to manufacture. The compensation lies in the fact that the ship will require less weight of armor and will therefore have more room for engine power and armament. Wrought iron gave way to steel; steel to Harvey and Harvey to Krupp. The Bethlehem people and the Carnegies have no divine right to supply this government with armor plate; everything comes in this world by natural selection. They supply this government with armor plate because a fine organization and an admirable personnel have given years of thought and study to and have invested millions in its manufacture; and from a purely business standpoint it would be folly for the government to attempt to compete with them. The government can buy armor cheaper than it can make it.

Industrial New Ontario, both possible and actual, were well outlined by F. H. Clergue, the moving spirit in the new enterprises at the Sault, in a recent address before the Toronto board of trade. Clergue is a man of most comprehensive mind, and in an address of 10,000 words unfolded to his hearers a plan of industrial development of vast proportions. The first step was the harnessing of the water power at the "Soo" and next the construction of a pulp mill which is the largest of its kind in the world. At present a sulphite fiber mill is under construction with an accessory plant for the recovery of sulphur from the ores of Algoma. Nearly all of these ores are sulphides and Mr. Clergue set about and succeeded in devising a method for extracting the sulphur from the ore. The sulphur, of course, was merely the by-product of the ferro-nickel and copper-nickel ores in which it occurred; and thus there will follow naturally the establishment of works for the manufacture of nickel and iron.

After extracting the sulphur, the nickel and iron were found in such a natural state of union that when smelted and reduced they produced an alloy of almost unequaled utility. This led to the projection of ferro-nickel works. Later there will follow chemical works for the production of sodium to be used in refining the nickel and copper constituents of the ore. The marketable by-products will be numerous. Iron ore lands are being developed, including the Helen hematite deposit in the Michipicoten district, and a railway, the Algoma Central, is being built to connect the raw material with the power at the "Soo." A branch of twelve miles of this railway in the iron ore district has already been constructed and its main line will eventually join the Canadian Pacific at Missinable. Subsidies from the Dominion government will, of course, be granted for nearly all the mileage of this railway. A land grant of 6,400 acres per mile is also being sought from the Ontario government. In England ships are being purchased and built to move to the ore markets such ores as cannot be consumed in the furnaces at the Sault. During the winter these vessels will be used in the Atlantic trade. Clergue is planning everything upon a gigantic basis.

Senator Frye says he still expects the shipping bill will be called up in the senate at least and passed during the present session of congress. He believes that nothing save filibustering can defeat it. There is a general impression throughout the country that a duty is levied upon materials which enter into ship construction, and it has been stated repeatedly that if the duty was removed ships could be constructed as cheaply in the United States as elsewhere. The fact is that all articles which enter into ship construction are admitted into the country free and have been

since 1872, Commissioner of Navigation E. T. Chamberlain, writing upon this point, says:

"Congress inaugurated the policy of admitting free of duty materials intended for the building of ships for the foreign trade, and for the trade between the Atlantic and Pacific ports of the United States as long ago as 1872, although at that time it was not so broad in its scope as at present. Section 10 of the act of June 6, 1872, is the first bearing on this point and it exempts all lumber, timber, hemp, nails, iron and steel rods, bars, spikes, nails and bolts and copper and composition metals which may be necessary for the construction of vessels in the trades named. The same articles, if intended for vessels in those trades, needing repairs, are also by that act admitted free of duty. By section 5 of the act of Feb. 3, 1875, yellow sheathing and yellow metal bolts, of which the component part of chief value is copper, were added to the free list in respect to ships building or repairing for the trades named. The tariff act of March 3, 1883, added wire rope to the articles previously exempted, and in that section included all the other material previously exempted. Section 8 of the McKinley tariff of Oct. 1, 1890, also added plates, tees, angles and beams, that is to say, practically all structural forms of iron and steel destined for ships to be built or repaired for the trades specified. Sections 7 and 8 of the tariff act of August 15, 1894, put everything on the free list needed for the construction and repair of such ships."

It is too early to intelligently discuss the trans-Pacific cable, but as it is destined to be one of the enterprises of the not-too-distant future a word or two may not be amiss. Whether it will be constructed by a private company under government support or whether it will be constructed by the government under the supervision of the navy department is left to the wisdom of an all-wise congress. The navy department is extremely anxious that the government shall build and operate the cable and, of course, it favors the all-American route, which is the southern route via Hawaii and Guam. This route is immense in its stretches and the laying of a cable to include such tremendous spans is an engineering feat not to be sneezed at. The manufacture, laying, care and operation of this cable will open up a new and important industry. The first thing will be the establishment of a plant and the construction of at least two cable ships. The unit of cable length is a shipful; and the custom of Europe is to manufacture the cable at a point adjacent to the pier at which the cable ship moors, so that the cable is coiled in the tanks of the ship as it is manufactured. The construction of the plant will, at a conservative estimate, cost \$1,000,000; the ships, two of which will be necessary, will cost \$600,000 each, and the cable itself will cost about \$13,000,000.

In presenting a letter to the senate, from the International Association of Machinists of Concord, N. H., asking that a portion of the government work on the new warships be given to the navy yards of the country, Senator Gallinger said: "I desire simply to say that I sympathize with this request. I have never been able quite to understand why we should have these expensive yards in the country and then proceed to give pretty nearly all the work to private ship yards. I presume it is done on the plea of economy, but it seems to me it is a false economy and that some of the work ought to go to the navy yards of the country."

Senator Gallinger should understand that in order to construct war ships at navy yards it would be necessary to keep up a much larger and far more expensive organization than is now kept at these yards. There is nothing false about the argument of economy. The government with its expensive methods could not possibly build ships in competition with the private yards. As it is the navy yards are kept fully occupied with repair work which is peculiarly their province. To enter into ship construction would be for the government to enter what is legitimately a private field.

The entire Liberian navy has been sunk. The daily newspapers did not rise to the importance of the occasion and dismissed the item briefly. Yet the annihilation of the Liberian navy was far more complete than that of the Spanish navy. Spain has today a considerable number of warships of various kinds afloat; Liberia has none. The hope of the nation to become a maritime power has been dashed to the bottom of the sea. Liberia will not pursue a policy of naval aggression. The full strength of the Liberian navy consisted of two gunboats. The first gunboat, while anchored peacefully in the harbor, sought the bottom in five and a half fathoms of water, and singular to relate, almost immediately thereafter the balance of the fleet performed that graceful evolution known as turning turtle in St. Paul's river.

Edward Smith & Co. of New York announce with profound sorrow the death of their vice-president, John Augustus Elmendorf, on April 5. Mr. Elmendorf was a man of excellent qualities and was well known in the varnish and color trade.

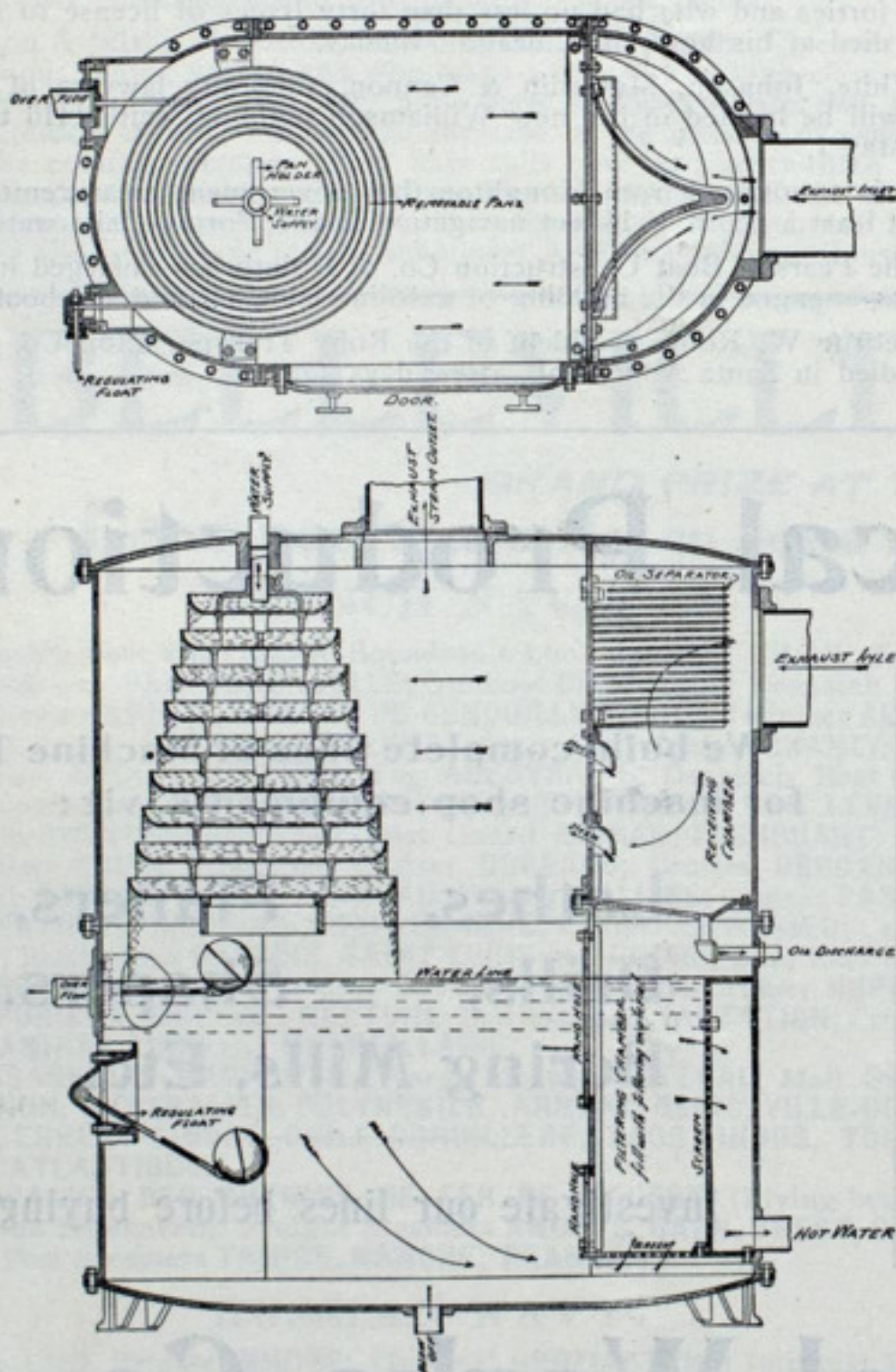
Col. Charles Bird of the quartermaster general's department has transmitted to the secretary of war an exhaustive report of his inspection of the transport service of the army. On the whole the report is quite favorable.

STILWELL'S CAST IRON HEATER.

The Stilwell-Bierce & Smith-Vaile Co. of Dayton, O., is placing on the market a new cast iron feed water heater. The cast iron heater which this company makes (the shell being made of boiler steel) is designed particularly for use on water which contains acids, salt or other material that pits or eats out wrought iron. The style of the heater is well portrayed in the accompanying illustrations—a general view of the heater and a sectional view.

Referring to the receiving chamber and oil separator it will be noted that the incoming exhaust steam impinges upon the conical deflecting plate, which is provided with grooves and which separates the cylinder oil, carrying it to sides and bottom of the chamber to the opening marked "oil discharge." This deflecting plate also carries the steam downward, as indicated by the arrows, to the two rectangular openings through which the steam passes into the heating chamber. The construction of the receiving chamber is such as to prevent shock and breathing of the heater, which would result from admitting the exhaust from high pressure engines direct into the heating chamber.

Steam is admitted into the heating chamber from the receiving chamber through two rectangular openings, which extend nearly across the plate that separates the two chambers. Two long continuous streams of steam are thus directed into the body of water which is falling constantly in thin sheets over the edges of the oval-shaped pans, thus presenting the best possible conditions for transferring the heat in the steam to the water. The uncondensed steam escapes freely from the top of the heater, and the



SECTIONAL VIEW OF IMPROVED CAST IRON HEATER.

construction is such as to prevent carrying water out with the escape steam. The lower portion of this heating chamber is a reservoir of large capacity filled with hot water. It also serves as a settling chamber and a receptacle for the condensation returned from radiators or heating coils that may be in use. This chamber is provided with two floats—one for regulating the inflow of feed water and one for regulating the overflow, thus affording a double safeguard against flooding the heater. The filtering chamber filters upward, thereby retaining any soft material at the bottom of the heater where it can be blown off. There is the special advantage of quick and easy access through large doors and handholes to every part of the heater.

The Nickel Plate road offers special low rate of one cent a mile traveled to Findlay, O., account annual encampment of G. A. R., department of Ohio. Tickets available May 7, 8 and 9, good returning until May 11 inclusive. Inquire of agents or address C. A. Asterlin, T. P. A., Ft. Wayne, Ind. 56, May 9.

AMONG MANUFACTURERS.

New York offices of the Berlin Iron Bridge Co., East Berlin, Conn., which will continue to be in charge of Mr. Seymour N. Robinson, will be removed to the St. Paul building, No. 220 Broadway.

The Brown Hoisting & Conveying Machine Co. of Cleveland, is filling an order for coal handling machinery for the Egyptian state railway. The plant is designed to handle 300 tons per day and will be installed at Alexandria at a cost of \$300,000.

The Marine Iron Works of Chicago has obtained the sole control on the lakes and western waters of the Watson radial water tube boiler for a term of years. Arrangements are being made at the Chicago works to put this boiler on the market in sizes from ten to 150 horse power.

The entire equipment of pumps on the Savoie and her sister-ship La Lorraine of the French line are of the Blake type, made by the George F. Blake Mfg. Co. of New York. The Review in saying recently that engines of the Savoie are of 12,000 horse power told only half the truth. There are two of them of 12,000 horse power each.

The Bullock Electric Mfg. Co. of Cincinnati has issued an instructive little catalogue devoted to marine lighting and power sets. It is well known that the requirements of the marine service are difficult to fill. Weight, space and durability are the three essentials which the Bullock company have sought to introduce in their marine sets and their success in combining them will delight marine architects and ship builders.

The Columbus Chain Co., Columbus, O., has been incorporated with a capital stock of \$100,000 and has elected the following officers: Clarence H. Hanna, president; Charles M. Wambaugh, vice-president and treasurer; S. A. Webb, secretary, and Daniel Carroll, superintendent. The company will manufacture a general line of chain goods which will include chains of any given dimensions and pitch for the transmission of power, under the patents granted Mr. Carroll by the United States, England and Germany. The latest improved machinery will be purchased.

The retirement is announced of Mr. J. D. Clary, for many years identified with the Bourne-Fuller Co. of Cleveland, dealers in iron and steel. The present organization of the Bourne-Fuller Co., in view of this change and the election of W. F. Bonnell as manager, announced last week, is as follows: President, B. F. Bourne; vice-president, H. A. Fuller; secretary, L. H. Elliott; manager, W. F. Bonnell; treasurer, H. C. Bourne. These, with Mr. E. H. Bourne, president of the Bourne & Knowles Mfg. Co. and cashier of the Union National Bank of Cleveland, comprise the board of directors.

The Standard Chain Co., the recently organized consolidation of the majority of the chain plants of the country, purchased last week the chain plant of the American Steel & Wire Co. at the latter's HP Nail Works, Cleveland. The machinery in this plant will be removed to Rankin, Pa., where the Standard Chain Co. is erecting a building 500 feet long and 100 feet wide. In addition the machinery in the Baker plant, together with the Garland plant which adjoins the new building, will have a capacity for turning out 25 per cent of the chain manufactured in the country. The report that all the plants taken into the consolidation would be concentrated in the Pittsburgh district is denied. The only concentration that will take place is that mentioned above, the remaining plants being operated as heretofore. The offices of the Standard Chain Co. are located in the First National Bank Building, Pittsburgh.—Iron Trade Review.

The American Insulating Material Manufacturing Co., Nos. 213 and 215 Third street, St. Louis, has just issued a little pamphlet, beautifully illustrated, giving a description of granite rock wool and its products. It would be well for everybody who is interested in boiler and pipe covering to write for one of these pamphlets. The coverings are produced from pure rock fibre and contain no cork, sponge, hair or other animal or vegetable matter. Granite rock wool is a perfect sponge material and no chemical or other change takes place in it. It is said to be practically indestructible and is at least worthy of investigation by steam users. It is made by converting granite rock to a fibrous condition. In appearance it consists of a mass of very fine fibres interlacing each other in every direction, forming an innumerable number of minute air cells. The St. Louis company claims that it is the only manufactured wool that is free from sulphur and acids and perfectly non-corrosive.

ACTIVITY IN DELAWARE RIVER SHIP YARDS.

From Camden, N. J., the report comes that the ship yards along the river front are unusually busy. At Dialogue's ship yard 300 men are employed. The firm is completing a new steel hull tugboat for the Propellor Tugboat Co. of Savannah, Ga. She will be 128 feet over all, 25 feet beam and 14 feet deep. The firm is also building a steel tugboat for the Tice Towing line of New York. This boat will be 135 feet over all, 25 feet beam and 15 feet deep. New boilers and machinery are also being placed in a wooden tugboat for John Scully of South Amboy, N. J. The firm is also doing considerable boiler and machine work for Mexican concerns. At the ship yards at Cooper's point, the various firms have a large amount of repair work on hand. The Mills yard is particularly active. Mr. Mills is building a new dredge and several scows for his own fleet. This firm has the contract for overhauling the entire fleet of colliers, scows and sea tugs of the Philadelphia & Reading railway. S. W. Tilton & Sons are building a lighter for Peoples Bros. of Philadelphia. Rilatt & Barrett have been overhauling the tugs Ellen McAvoy, Isabel and Harry Schaubel, Jr., the schooners Jane Middleton and Rebecca Sheppard and a number of barges. Peter Hagan & Sons are building four barges for their own fleet.

The Prindle Engineering Co. of Camden, N. J., is the lowest bidder at \$37,500 for the construction of a pumping plant at dry dock No. 1, New York navy yard.

The keel of the new Steamer Mainlander, which is to be operated by Cook & Co. on the Vancouver line, has been laid at the ship yards of Crawford & Reid, Tacoma, Wash. She will be launched on July 4. She will be a Tacoma-built boat from stem to stern and will be the largest steamer ever turned out by Crawford & Reid. Work will be rushed upon her to make room for other boats that are to be built at the same yards.

OPERATIONS IN THE LAKE SHIP YARDS.

As new vessels are now quite rapidly leaving the stocks in lake ship yards, orders to put down ships for next year are, of course, expected and considerable figuring is going on. There is some hesitancy about new orders among the managers of the steamship lines, on account of the demand for lower prices that seems to prevail everywhere, especially in the iron and steel industry, and it is not probable that the interview given out a day or two ago by President Gates of the American Steel & Wire Co., who, for some reason, takes a discouraging view of the situation, will do any good on this score. But the ship builders claim that the conditions surrounding that part of the steel industry to which Mr. Gates refers, do not apply to material entering into ships, and, although there has been some shrinkage in prices, it will not extend in any marked degree to the important item of steel shapes, which is controlled by a strong combination. It must be admitted, however, that the waiting disposition among users of steel and iron of all kinds will have some effect on ship yard orders, notwithstanding the urgent demand that still exists for new vessels.

The Canada Atlantic Transportation Co., operating a line of steamers between Chicago and Parry Sound, and whose offices in this country are on Sherman street, Chicago, has asked for bids on four steamers of 6,000-ton package freight kind, and as this company has very strong Canadian backing and has been pressed for ships for some time past, it will not be at all surprising if the order is placed very shortly. The Ann Arbor Railway Co. and the Pere Marquette company are both figuring for steel car ferries. It is not probable, however, that either company will contract for more than one boat and there is nothing definite as to when orders will be given. It is said that the Pere Marquette company's new steamer, which will be built for the Muskegon-Milwaukee run on Lake Michigan, will be larger than any car ferry in operation on the great lakes. The car ferry Muskegon has a capacity of twenty-six cars, the Pere Marquette thirty-eight cars and the new car ferry will be able to take on conveniently forty cars. This number is sufficient to make up two good-sized freight trains.

J. G. Westbrook of Ogdensburg, N. Y., general superintendent of the Ogdensburg Transit Co.—Rutland line of steamers operating between Chicago and Ogdensburg—has had under consideration for some time past the construction of two steel steamers that would be suited to both passenger and freight service on that line. Of course they would be of Canadian canal dimensions. It is understood that W. J. Wood, naval architect of Chicago, was to have begun work on the plans several weeks ago, but the construction of the vessels was deferred until such time as better figures might be secured from the lake builders, who are now crowded with work.

Gilmore's ship yard at Toledo is a very busy place. The George B. Owen is being calked and her rudder pintle fixed. The floors of the Folsam are being put in good condition and a few minor repairs are to be made. The Mary Mitchell has been raised 4 feet. She has new floors, new decks and new upper works. The tug Goldsmith is being put in shape for another season's work and the tug Marinette will receive new deck

beams, covering board and stanchions. The barge Brake and the steamer Saginaw are also being repaired.

It is said that the movement on the part of Edward Smith and others of Buffalo to secure control of the stock of the Buffalo Dry Dock Co., which was organized a short time ago when the Mills docks were bought, is connected with the plans of the American Ship Building Co. to undertake the repair of vessels at Buffalo. The Buffalo Dry Dock Co. is capitalized at \$350,000 and the stock is in very few hands.

It is more than probable that the steamers Badger State and Empire State, which were engaged in passenger and freight service between Toledo, Cleveland and Ogdensburg on the St. Lawrence last season, will be transferred to some other route during the coming season, probably between Buffalo and Green Bay or Menominee on Lake Michigan, taking the place of the Lackawanna line steamers that have given up that route.

Charles E. Buroker and J. C. Bennett have been appointed by the Ohio state game and fish commission a committee to supervise the construction of a patrol boat for Lake Erie. The boat will cost \$12,000 and will be used to keep a lookout for violators of the laws governing the fisheries.

Wallace Bros. and Capt. Edward Cunningham of Detroit have sold the wooden steamer New Orleans to Capt. John Hall and others of Buffalo for \$70,000, and have purchased in place of the New Orleans the steamer C. T. Morley from W. B. Morley of Marine City for \$90,000.

The Nipigon Transit Co. has been formed to operate the steamer J. C. Ford and other vessels. The capital of the company is \$50,000. Paul Weidner and Alfred K. Keifer of Detroit and Otto L. E. Weber of Port Huron are stockholders. The home office is in Detroit.

The steamer H. E. Runnels, lately purchased by Spence Bros., contractors, of Cleveland, from Port Huron parties, has been sent to the ship yard of Abram Smith & Son, Algonac, Mich., for removal of upper deck and general overhauling.

Representative Alexander has introduced a bill in the house of representatives to provide for a marine hospital building at Buffalo. The total appropriation called for is \$125,000, but only \$25,000 is appropriated at this session.

Capt. Richard A. Davis, who was in command of lake vessels back in the forties and who had no less than forty issues of license to sail the lakes, died at his home in Chicago Monday.

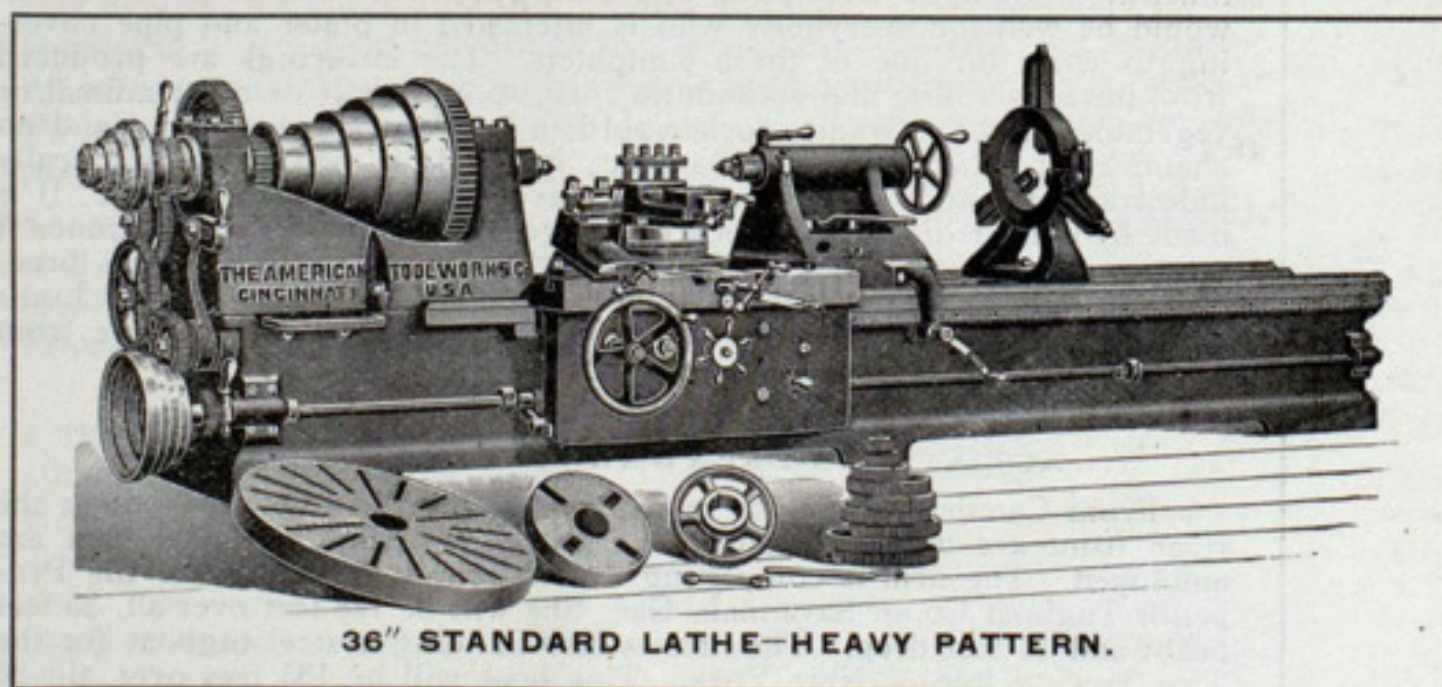
White, Johnson, McCaslin & Cannon, admiralty lawyers of Cleveland, will be located in the new Williamson building, suite 1416 to 1421, after May 1.

It is announced from Houghton that government measurements insure at least a depth of 14-feet navigation in the Portage lake waterways.

The Pearson Boat Construction Co. of Duluth has enlarged its plant and has engaged in the building of gasoline launches and sail boats.

George W. Roby, president of the Roby Transportation Co. of Detroit, died in Santa Anna, Cal., a few days ago.

Tools for Economical Production.



36" STANDARD LATHE—HEAVY PATTERN.

We build complete lines of Machine Tools for machine shop equipments, viz:

**Lathes, Planers,
Drills, Shapers,
Boring Mills, Etc.**

Investigate our lines before buying.

The American Tool Works Co.,

BUILDERS OF COMPLETE LINES OF MACHINE TOOLS,

WORKS: CINCINNATI, U. S. A.

NEW YORK OFFICE: 120 Broadway,
Geo. Place, Agent.
NEW ORLEANS: The Fairbanks Co.
CHICAGO STORE: 68-70 South Canal Street.
PHILADELPHIA: The Fairbanks Co.
CLEVELAND: The Strong, Carlisle & Hammond Co.
BOSTON STORE: 36 Federal Street.
BALTIMORE: The Fairbanks Co.

SAN FRANCISCO: Henshaw, Bulkley & Co.
DENVER AND SALT LAKE CITY: The Mine & Smelter
Supply Co.
LONDON: Alfred Herbert, Ltd., 7 Leonard St.,
Finsbury, E. C.
DÜSSELDORF: de Fries & Co., Act. Ges.,
Graf Adolf Strasse, 83-87

ANTWERP: Nyssens Freres, 33 Rue des Peignes.
BERLIN: de Fries & Co., Act. Ges.,
Kloster Strasse, 13-15.
PARIS: Roux Freres & Cie., 54 Boulevard
du Temple.
MOSCOW: Alfred Stucken.

TRADE NOTES.

Owing to the increased demand for paste polish the Bertram's Oil Polish Co. of Boston, Mass., is putting up paste polish in packages of various sizes, which are having a very large sale. The polish business looks better than ever with this company.

The Link Belt Machinery Co. of Chicago, engineers, founders and machinists, have issued a most instructive catalogue under the title "Modern Methods of Handling General Merchandise." Pictorially it shows the wonderful revolution which has taken place in handling merchandise from the store to the delivery wagon.

Manzel Bros. of No. 87 Van Rensselaer street, Buffalo, manufacturers of automatic oil pumps, have issued a dainty little catalogue. Their pump will feed any oil or graphite and is not affected in any degree by variations of temperature. It is especially designed to meet the demands for more reliable and economical lubrication.

The M. C. Bullock Mfg. Co. of Chicago, recently shipped two hoists to the Mesabi range, while another is ready for shipment to the Black Hills. Diamond drills have been shipped to the Lake of the Woods mining district, to the Kootenay district, to Arizona and to Japan; rock drills to Alaska and other points and an engine to the city lighting plant at Detroit. The company has also taken an order recently for three mine ventilators for Japan.

The American Blower Co. of Detroit, has issued a beautifully-illustrated catalogue of its disc ventilating fans. Fans have grown rapidly in popular favor of late years for the ventilation of all kinds of buildings, the removal of smoke, gases and dust; also for cooling overheated boiler and engine rooms. The "A B C" is spoken of as entirely different from any other fan in the market—built for the noiseless delivery of a maximum volume of air with a minimum expense for power.

"Monier Constructions" is the title of a forty-page booklet written by E. Lee Heidenreich, sole representative of the system for the United States, and whose offices are at 541-45 the Rookery, Chicago. Mr. Heidenreich describes the principles of Monier construction, consisting of two materials, wrought iron or steel and mortar, and the application of the system in constructing tanks and elevators, in hydraulic engineering and in bridge construction. The little book is well illustrated with views of works already constructed and with plans of various plants.

Wilson & Silsby of Boston, who furnished sails for the Defender and other famous sailing yachts, and who make a specialty of high-class work of this kind, announce that they have been so busy of late that there is every reason to look for unusual increase in the interest of yachting during the coming summer. They have calls now for twenty-three suits from B. B. Crowninshield, eighteen from Tams, Lemoine & Crane of New York, eleven from Lawley and ten from Stearns of Marblehead. New suits have also been made for the schooners Adrienne, Alcaea, Constella-

tion (two suits), Ingomar, Mayflower, Columbia, Fortuna, Maude Palmer, Quissetta and Young Bros. Four suits are being made for Hanley, two for S. N. Small, four for G. R. Liljegren of Gothenburg, Sweden, three for Ramley of White Bear lake, Minn., six for L. D. Huntington, two suits for Jensen, two for C. D. Mower and three for Amundson, also of White Bear lake, Minn. Other sets are being made for William Robinson, W. E. C. Eustis, J. S. Sheffield of Newark, F. L. Johnson of Concord, N. H., G. F. Anderson of Sandusky, W. H. Childs of New York, Reginald Boardman, L. Bacon, G. B. Gale of Atlantic City, J. Fred Brown, R. C. Robbins (raceabout Pirate), C. C. Warren of Sandusky, Hazen Morse of New Rochelle, Dr. W. F. Whitney (sloop Owl), W. B. Rogers, Archibald Rogers, Horatio Adams, Charles Williams, G. E. Hills, Jr., T. H. MacDonald of Bridgeport (cat Kit), Howard Stockton, A. Rohlf of Seattle, J. Beaver Webb (raceabout Persimmon), E. G. Cuthbert of Chicago, F. D. Lawley, E. A. Parker of Atlantic City, steam yacht Marcella, raceabout Spindrift of New York, W. S. Almy of Providence, Wilton Crosby of Osterville and C. H. W. Foster.

ARBECAM NAUTICAL INDICATOR.

Lieut. Charles A. Foster, a retired officer of the United States navy, has been in Cleveland and other lake cities recently introducing the Arbecam nautical indicator or adjustable alidade, a device that furnishes a ready and accurate means of determining the exact bearing of objects directly from the ship's compass dial, and which is manufactured by the Arbecam Indicator Co., 53 State street, Boston.

The instrument is of brass and consists of a sighting tube with cross wires and rifle sights. A colored glass screen may be fitted to it for taking bearings of the sun. The telescope is adjustable to any angle or motion of the vessel, and is attached to a rod working in an outer tube or case, which can be lengthened or shortened as desired and clamped in the position desired. This telescopic rod is centered in the top of the binnacle cover and firmly held in an upright position by a bearing plate set up by a nut screw. On the lower end of the rod is attached, by a triple joint which takes up the ship's motion at all times, the indicator, which is balanced by a counter weight on its upper arm, serving to adjust its spread to the size of the compass card used.

The indicator is in the same plane with the telescope and moves with it. No matter what the motion may be the pointer is always held in correct position and rests on the compass rim, giving an accurate bearing. It is kept in place at all times, ready for use night or day.

The master using this instrument can shape and follow his course on a true line, saving both time and fuel, as well as insuring safe navigation. A most important factor in the instrument is its perfect accuracy in taking bearings, cross bearings, or four-point bearings, especially at night. Its simplicity is its best recommendation. It has been adopted by the United States revenue cutter service and will undoubtedly be adopted shortly by the United States navy.

BELLEVILLE GENERATORS.

GRAND PRIZE AT THE WORLD'S FAIR OF 1889.

List of Ocean Steamships on Board which BELLEVILLE GENERATORS are Used.

FRENCH NAVY.

Despatch Boat **VOLTIGEUR**; Squadron's Look-out Ship **MILAN**; Squadron's Look-out Ship **HIRONDELLE**; Gunboat **CROCODILE**; Despatch Boat **ACTIF**; Cruiser **AMIRAL RIGAUD DE GENOUILLY**; Iron Clad Cruiser **ALGER**; Iron Clad Cruiser **LATOUCHE-TREVILLE**; Iron Clad Cruiser **CHANZY**; Iron Clad Cruiser **AMIRAL CHARNER**; Tug **ABERVAC'H**; Despatch Boat **CAUDAN**; Torpedo Despatch Boat **LEGER**; Torpedo Despatch Boat **LEVRIER**; Battleship **BRENNUS**; Protected Coast Guard **AMIRAL TREHOUART**; Iron Clad Cruiser **BRUX**; Iron Clad Cruiser **BUGEAUD**; Cruiser **DESCARTES**; Battleship **BOUVET**; Cruiser **POTHUAU**; Cruiser **GALILEE**; Cruiser **PASCAL**; Cruiser **CATINAT**; Battleship **CHARLEMAGNE**; Cruiser **LAVOISIER**; Cruiser **PROTET**; Battleships **GAULOIS**, **SAINT LOUIS** and **HOCHE**; Iron Clad **IENA**; Cruiser **DESAIX**; Iron Clad Cruiser **DUPETIT-THOUARS**; Cruiser **DUPLEIX**; Cruiser **FURIEUX**; Battleship **NEPTUNE**; Battleship **DEVASTATION**; Cruisers **SULLY**, **AMIRAL AUBE** and **MARSEILLAISE**.

MESSAGERIES MARITIMES: Cargo Steamer **ORTEGAL**; Mail Steamships **SINDH**, **AUSTRALIEN**, **POLYNESIEN**, **ARMAND-BEHIC**, **VILLE-DE-LACIOTAT**, **ERNEST-SIMONS**, **CHILI**, **CORDILLERE**, **LAOS**, **INDUS**, **TONKIN**, **ANNAM**, **ATLANTIQUE**.

COMPAGNIE DES CHEMINS DE FER DE L'OUEST, (Plying between Dieppe and Newhaven): Freight Steamers **ANGERS**, **CAEN**, **BREST**, **CHERBOURG**; Fast Steamers **TAMISE**, **MANCHE**, **FRANCE**.

RUSSIAN NAVY.

Iron Clad Frigate **MININE**; Gunboat **GROZIASTCHY**; Imperial Yacht **MAREVO**; Imperial Yacht **STRELA**; Gunboat **GREMIASCHY**; Gunboat **OTVAJINI**; Imperial Yacht **TZAREWNA**; Imperial Yacht **STANDARD**; Cruiser **ROSSYA**; School Ship **VERNY**; Cruiser **SVETLANA**; Cruiser **DIANA**; Cruiser **PULLADA**; Torpedo Transport Boat **BAKAN**; **KHERSON** and **MOSKBA**, Ships of the Volunteer Fleet; Gunboat **GILACH**; Iron Clad **EKATERINA II**; Gunboat **KOUBANETZ**; Cruiser **AURORA**; Iron Clad **EMPEREUR NICOLAS I**; Iron Clad **PRINCE POTIEMKINE DE TAURIDE**; Cruiser **BAYAN**; Iron Clad **CESAREWITCH**; Gunboats **TERETZ** and **OURALETZ**; Iron Clad **BORODINOW**; **SMOLENSK**, Ship of the Russian volunteer fleet; cruiser **BOJARINE**.

ENGLISH NAVY.

Torpedo Boat Destroyer **SHARPSHOOTER**; **POWERFUL** and **TERRIBLE**, iron clad cruisers; **GLADIATOR**, **ARROGANT**, **FURIOUS**, **VINDICTIVE**, cruisers; **NIOBE**, **DIADEM**, **ANDROMEDA**, **EUROPA**, cruisers; **CANOPUS**, **GLORY**, **GOLIATH**, **ALBION**, **OCEAN**, iron clad ships; **ARGONAUT**, **ARIADNE**, **AMPHITRITE**, **SPARTIATE**, **HERMES**, **HIGHFLYER** and **HYACINTH**, cruisers; **VENGEANCE**, iron clad; **ALBERT** and **VICTORIA**, royal yacht; **CONDOR**

and **ROSARIO**, sloops; **CRESSY**, **ABOUKIR**, **SUTLEY** and **HOGUE**, cruisers; **IMPLACABLE**, **FORMIDABLE** and **IRRESISTIBLE**, **VENERABLE**, **LONDON**, **BULWARK**, iron clad ships; **EURYALUS**, **BACHANTE**, cruisers; **MUTINE**, **RINALDO**, **SHEARWATER**, sloops; **CORNWALLIS**, **DUNCAN**, **EXMOUTH**, **RUSSEL**, iron clad ships; **DRAKE**, **KING ALFRED**, **LEVIATHAN**, **AFRICA**, cruisers; **VESTAL**, sloop; **MONMOUTH**, cruiser; **BEDFORD**, cruiser; **ESSEX**, **KENT**, cruisers; **ALBEMARLE**, **MONTAGUE**, battleships.

The total horse power of boilers fitted on board the 57 above named ships of the British navy is nearly 900,000.

AUSTRIAN NAVY.

BUDA-PEST, iron clad coast guard; **KAISER KARL VI**, cruiser; **X'**, **X'''**, battleships.

ITALIAN NAVY.

VARESE, cruiser; **BENEDETTO BRIN**, battleship.

ARGENTINE REPUBLIC.

PUYERREDON, cruiser; Steamships **PUERTO-HUERGO** and **MENDOZA**.

SPANISH NAVY.

REINA REGENTE, cruiser.

CHILIAN NAVY.

O'HIGGINS, cruiser; **ALMIRATE LYNCH**, torpedo boat destroyer; **ALMIRANTE CONDELL**, torpedo boat destroyer; **GENERAL BAQUEDANO**, school ship.

JAPANESE NAVY.

SHIKISHIMA, iron clad; **CHIYODA**, cruiser; **ASAHI**, iron clad; **IWATE**, cruiser; **AZUMA**, cruiser; **HATSUSE**, iron clad; **ITSUKUSHIMA**, iron clad coast guard; **MIKASA**, battleship.

UNITED STATES OF AMERICA.

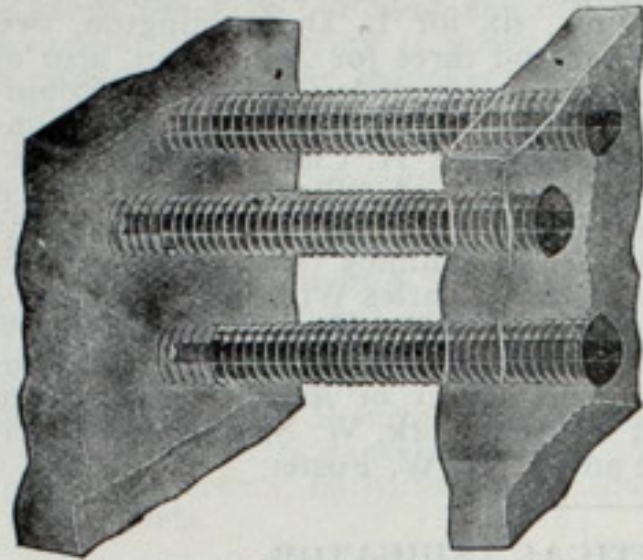
Northern Steamship Co.'s Passenger Steamers **NORTH WEST** and **NORTH LAND**, of 7,000 H. P. each; yachts **SHEARWATER**, **CORYELL**, **WILD DUCK**, **SULTANA**.

Cable Address: BELLEVILLE SAINT-DENIS-SUR-SEINE.

General Information Sent on Demand.

HOLLOW STAYBOLTS.

Officials of the Falls Hollow Staybolt Co., Cuyahoga Falls, O., say that the increase in the use of hollow staybolts among ship builders has been so large of late that it is only a matter of a short time until this kind of bolt will be used almost exclusively in marine practice. Builders of locomotives were ahead of the ship builders in adapting hollow staybolt iron and in that line also there is a very large increase in the amount of it that is being used. It is specified by the railway companies. Rules of the United States steamboat inspection service require that where solid bolts are used they must be drilled at the ends, so that breaking bolts may be detected. It was this safeguard for the detection of broken bolts that led to the development of the hollow bolt by the Falls company. They make both solid and hollow bolts but they claim that the latter are better than drilled or punched bolts in every way. The hole is central and of any size desired, extending clear through the entire length of the bolt, making the strength uniform. The end next to the fire-box may be closed or left open. The best quality of charcoal iron is used. The drilling of tell-tale holes in the ends of solid bolts certainly weakens them and causes them to break at the vital point, while it is claimed that the hollow bolt is even stronger than the solid material and is a self-inspector, a detective. It is more flexible than a solid or



drilled bolt, saves inspection and explosions and warns automatically. The manufacturers say they will be pleased to furnish samples upon application. The average length of bars is 7 feet with diameter of any size, inside or out.

AMERICAN TOOLS IN THE FAR NORTH.

From the far north among ice fields, in a part of the world almost desolate of civilization, with nothing but snow and cold of the severest kind, comes a letter to the Chicago Pneumatic Tool Co. congratulating them upon work accomplished with their new submarine drill. The writer, Mr. Beliankian, is a constructor in the Russian navy, who is in charge of a gang of men working on the damaged battleship Apraxin. He writes very flatteringly in the Russian language of the hard tests to which the drill has been subjected under water in drilling through granite and other substances. A photograph of his surroundings shows the most undesirable place imaginable. "Excuse me for writing in Russian," he says. "My secretary is in St. Petersburg and I am here alone, with nothing but snow and ice, and the mail reaches me very seldom, as the sea is frozen all around."

Andrew D. Cramp, who was at one time the superintendent of the Cramp ship yards, died in Boston a few days ago. He was forty-three years of age. After leaving the high school he began as an apprentice in the yards and progressed rapidly. He was a son of William Cramp. He had been ill for a number of years.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of April 18, 1900.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire.....	46	46	41 1/4	41 3/4
American Steel & Wire, Pfd.....	80 1/2	81 1/2	77 1/2	77 1/2
Federal Steel	43	44	41 1/4	42 3/4
Federal Steel, Pfd.....	69 7/8	70 1/2	69 7/8	70
National Steel.....	39 1/2	39 1/2	38 3/4	39
National Steel, Pfd.....	91	.....	.....	91
American Tin Plate	29 1/2	29 3/4	29 1/2	29 1/2
American Tin Plate, Pfd.....	.....	.....	.....	.....
American Steel Hoop.....	28	29 1/2	27 3/4	28
American Steel Hoop, Pfd.....	74	74	73 1/2	73 1/2
Republic Iron & Steel.....	18 3/4	18 1/2	18 1/2	18 1/2
Republic Iron & Steel, Pfd.....	.....	.....	.....	.....

THE KENNEY FLUSHOMETER

FOR FLUSHING WATER-CLOSETS.

THE BEST SYSTEM EVER INVENTED
FOR USE ON STEAM VESSELS.

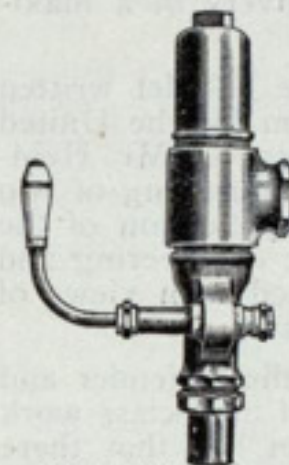
NO CUP LEATHERS OR SPRINGS.

Owners and Constructors of Steamships,
Yachts and Steamboats have found
it indispensable.

Used by the U. S. War and Navy Departments—Transports Grant, Sheridan, Burnside, Terry, Hooker, Thomas, Sedgewick, Meade, Crook, McClellan, Sherman. Also Albany Day Line Steamers, and others.

THE KENNEY COMPANY,

Send for Catalogue. 72 to 74 Trinity Place, NEW YORK.



Showing application of Flushometer.

CAPT. GEO. A. SIMPSON, Expert Compass Adjuster,
19 YEARS EXPERIENCE.
Yearly Contracts Solicited. Nautical Instruments Repaired.
OLD 'PHONE No 319. SAULT STE. MARIE, MICH.

THE Q AND C

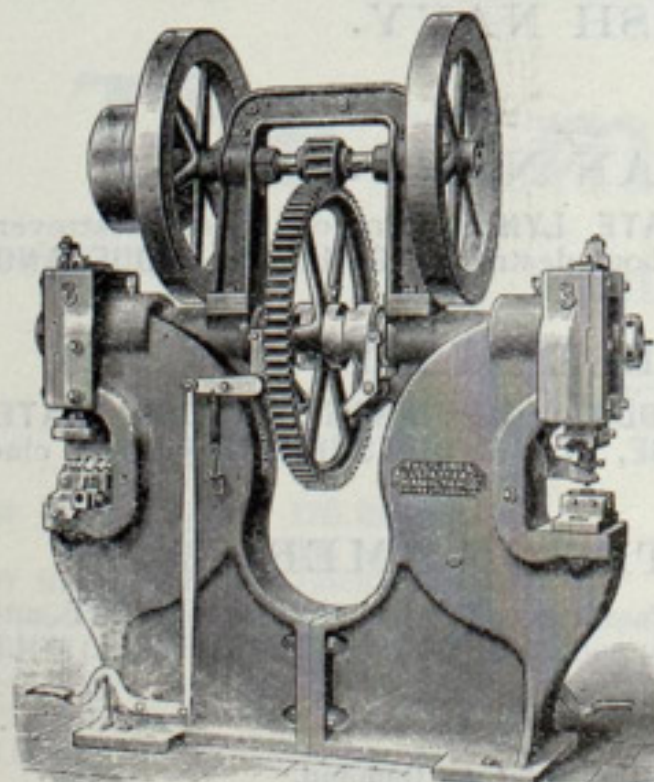
PNEUMATIC TOOLS

CAN BE USED EVERY WHERE

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NEW YORK

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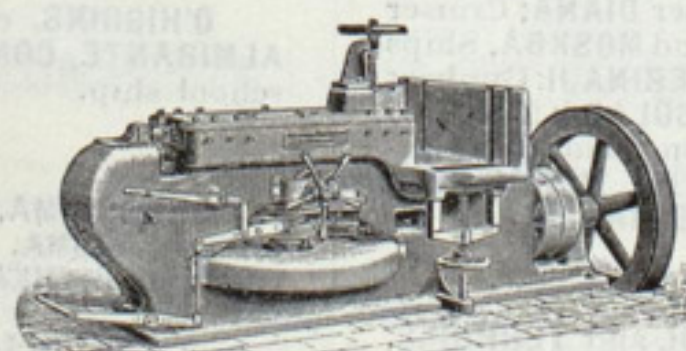
LABOR-SAVING



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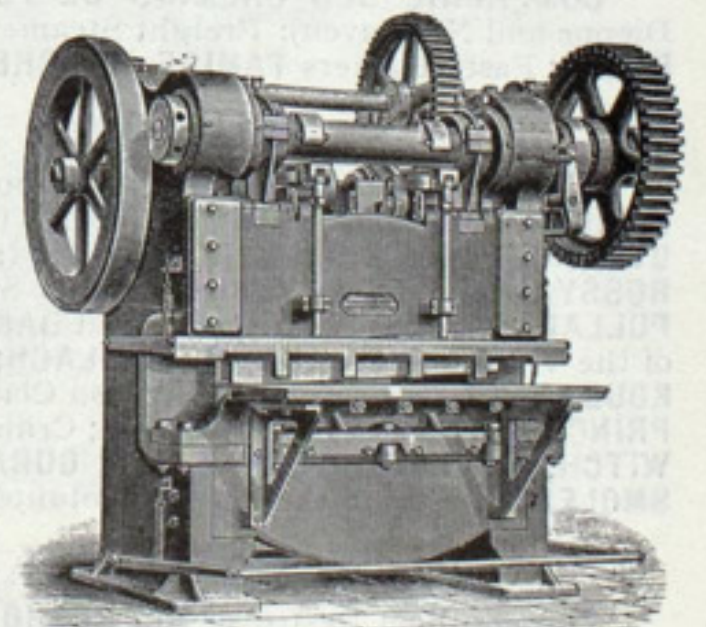
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NOW READY.



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For All Kinds of Work.

THE **LONG & ALLSTATTER CO.,** HAMILTON, OHIO.

THE CHAMPION RIVET CO.

Government Work
a Specialty.



Quality:
Highest Standard.
Finish: Unexcelled.

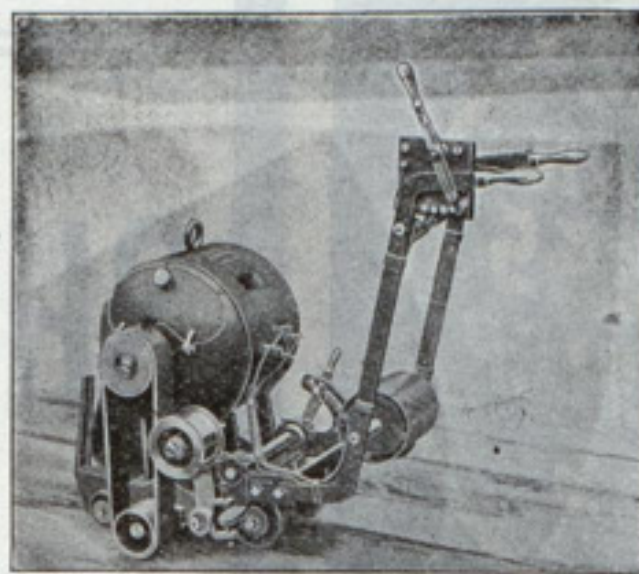
CLEVELAND, O., U. S. A.

VICTOR BOILER AND STRUCTURAL RIVETS.

BUSINESS CHANCE FOR A BUSINESS MAN to establish a branch agency in New York for a new meritorious product manufactured under a patented process in France and Mexico, and endorsed and adopted by four foreign governments and twenty-eight railway companies abroad. United States Arsenal tests and reports now ready for publication, with many authoritative testimonials. The product has an enormous demand with positively no competition in the United States, and will be shipped on trial to any interested responsible party. Applicants are expected to furnish the very best of references, and to such exceptional inducements with credit, will be granted in the United States. An independent income for a competent business man. Wire us your intentions, and secure your territory at once. The National Ore & Reduction Co., Durango, Mexico.

May 3.

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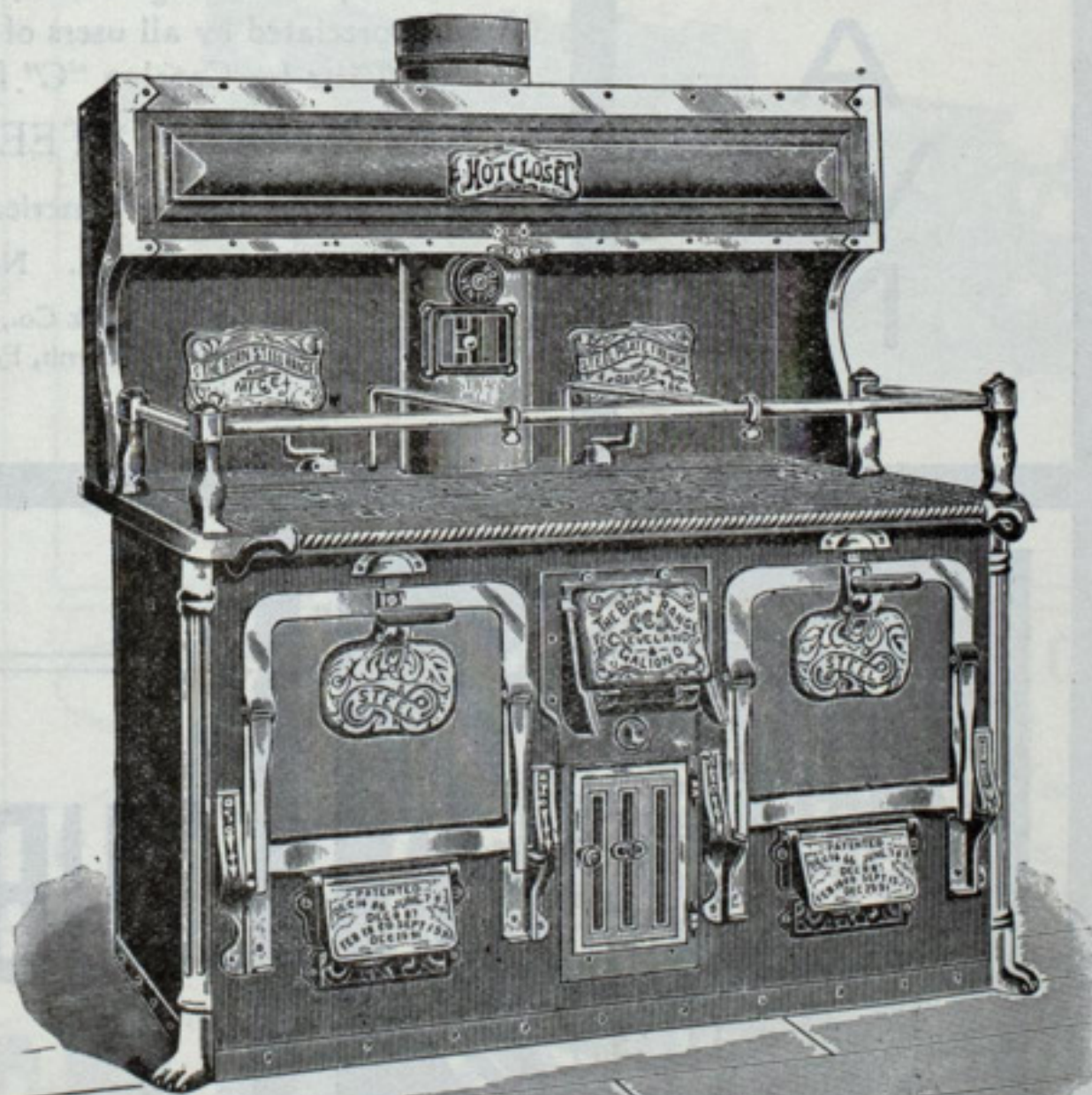
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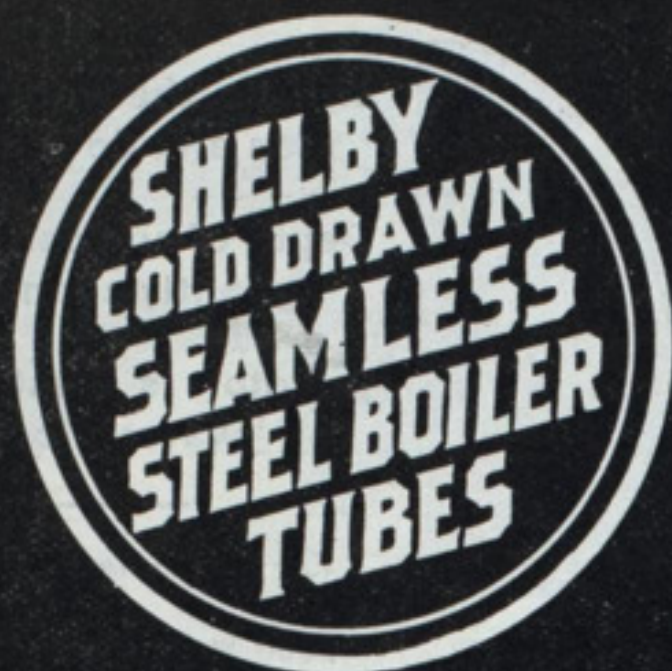
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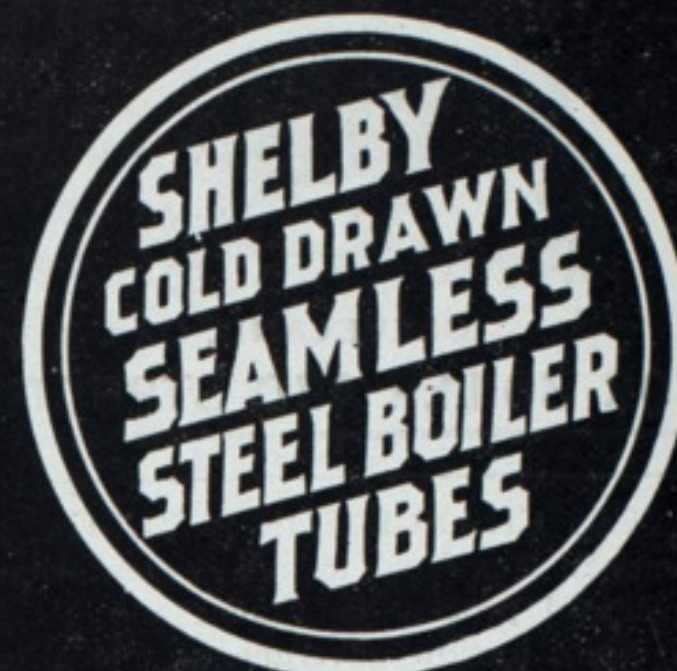


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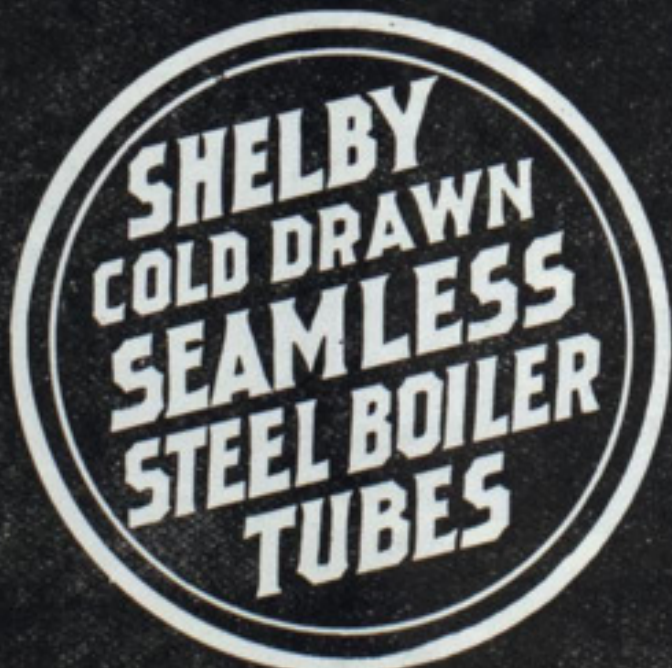
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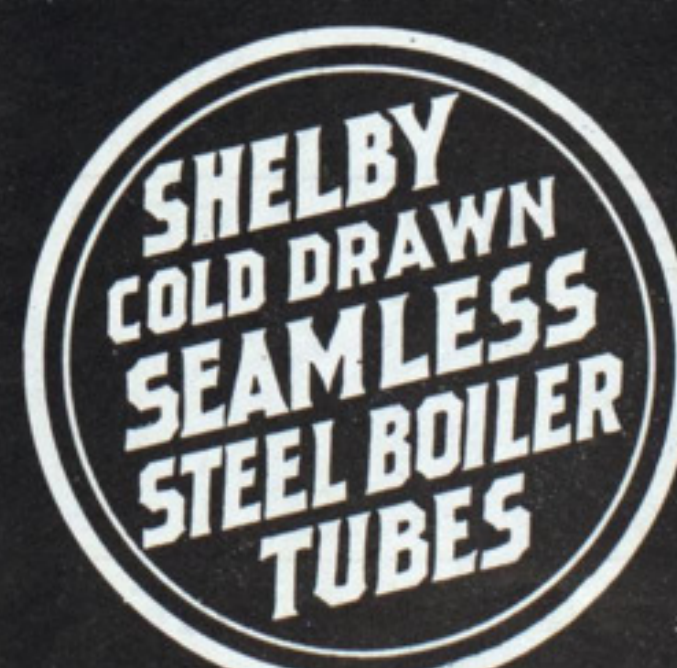
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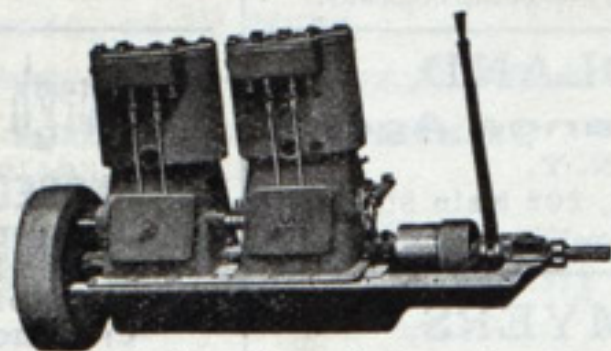
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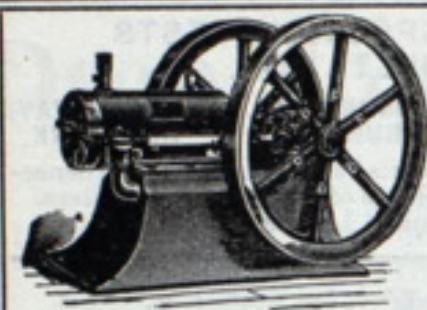
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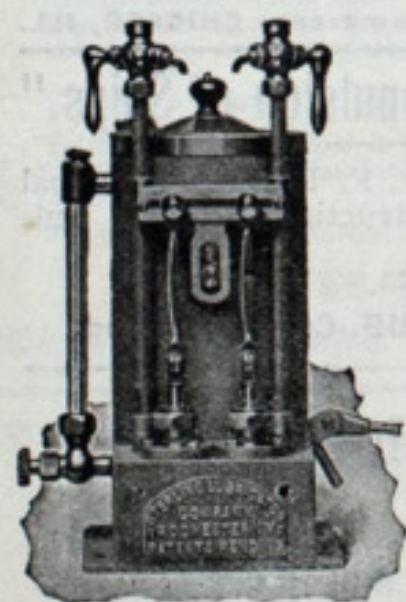
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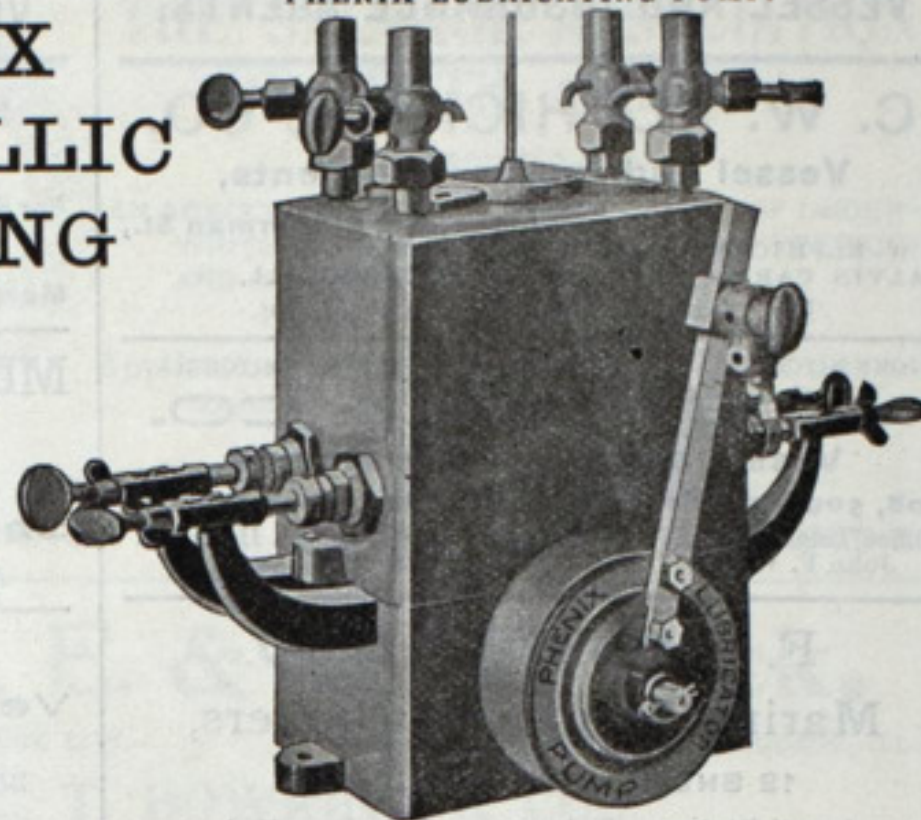
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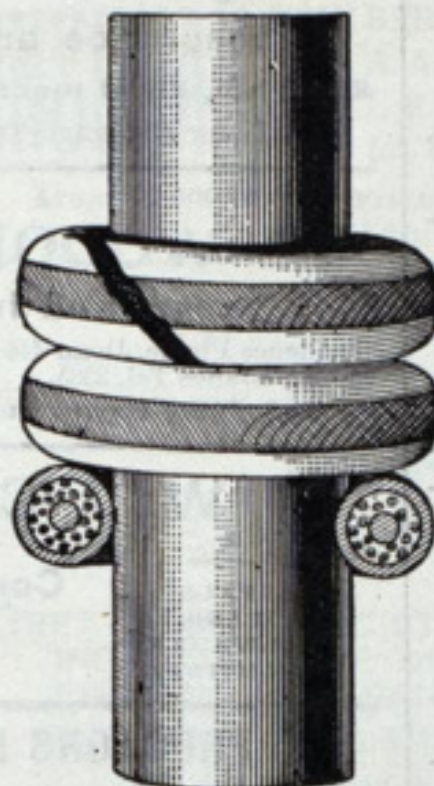
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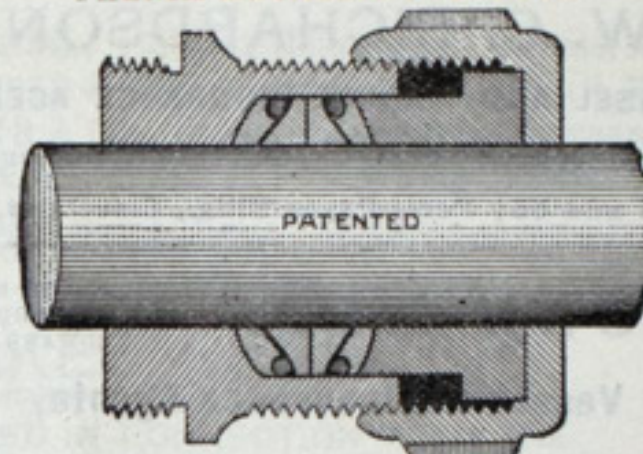
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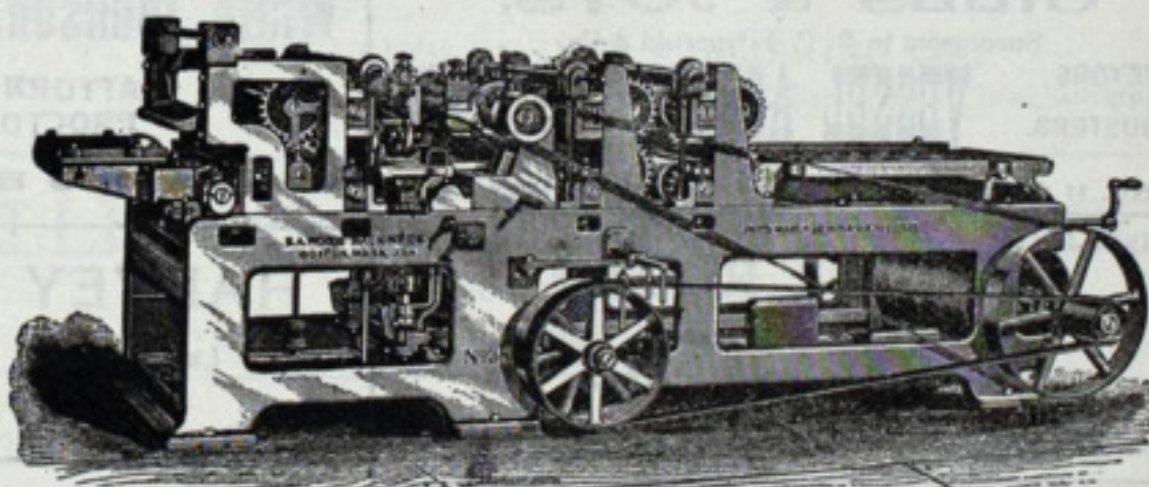
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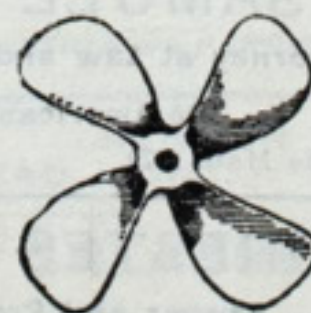
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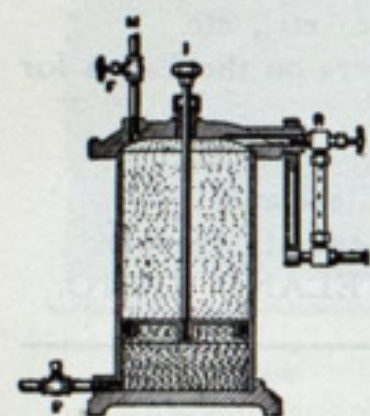
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8	9	10	11	12	13	14
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22	23	24	25	26	27	28
29	30

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U. S. Engineer Office, Jones Building, Detroit, Mich., April 6, 1900. Sealed proposals for removing boulders, excavating limestone bedrock, and dredging in lower Detroit River, will be received here until 12 noon (standard time), April 30, 1900, and then publicly opened. Information furnished on application. G. J. Lydecker, Lt. Col., Engrs.

April 26.

Deep Water Harbor, San Pedro, Cal.—U. S. Engineer Office, Laughlin Building, Los Angeles, Cal., April 12, 1900. Sealed proposals for continuing construction of breakwater at San Pedro, Cal., will be received here until 11 A. M. May 14, 1900, and then publicly opened. Information furnished on application. James J. Meyler, Capt., Engrs.

May 3.

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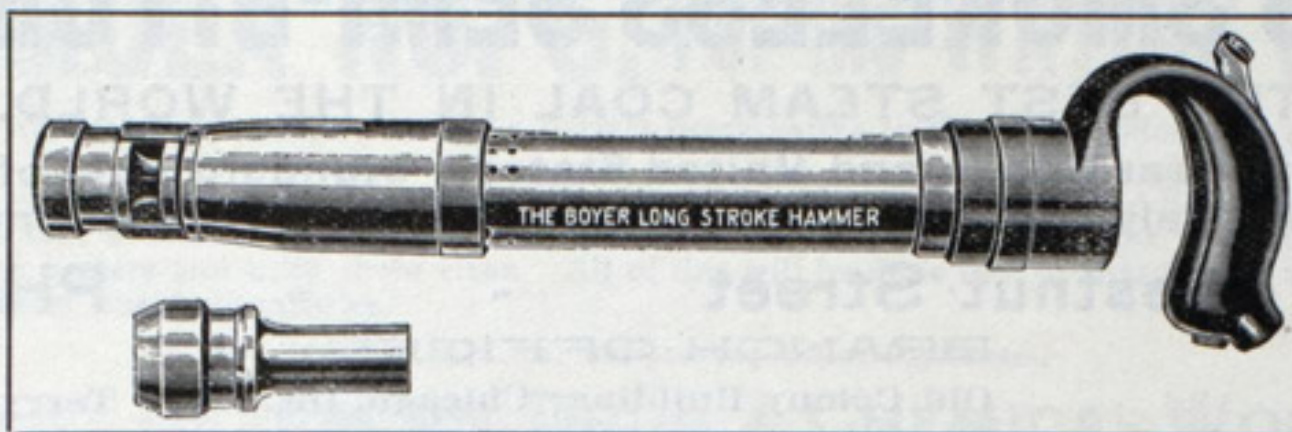
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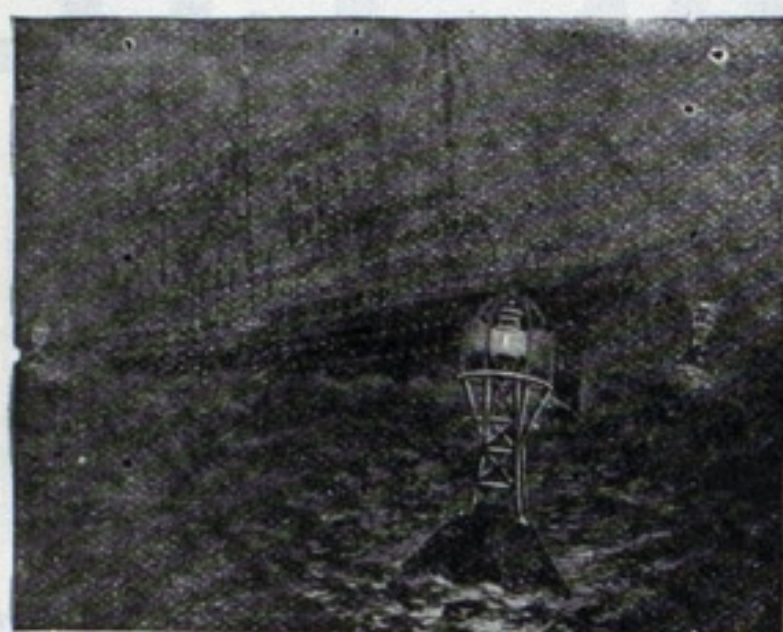
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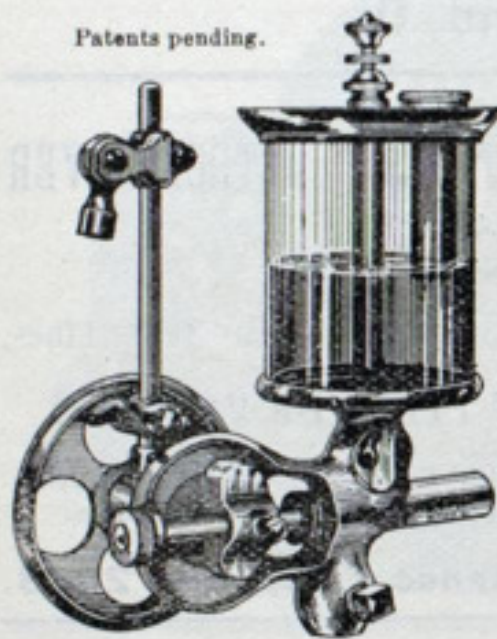
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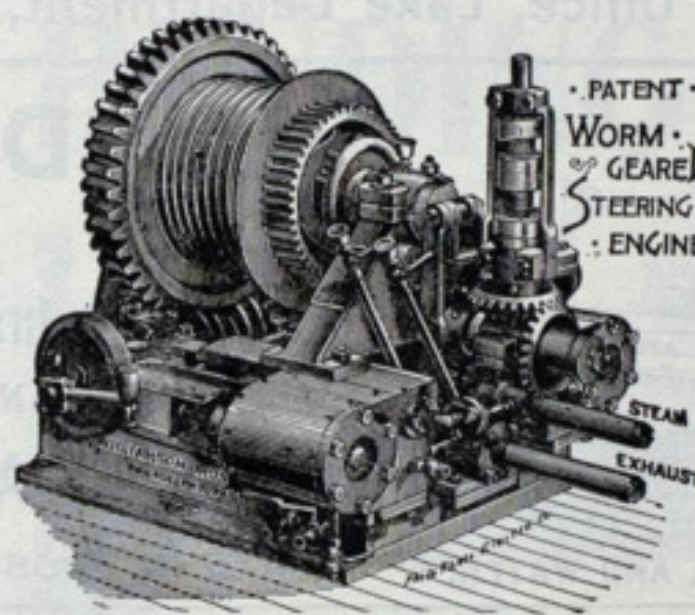
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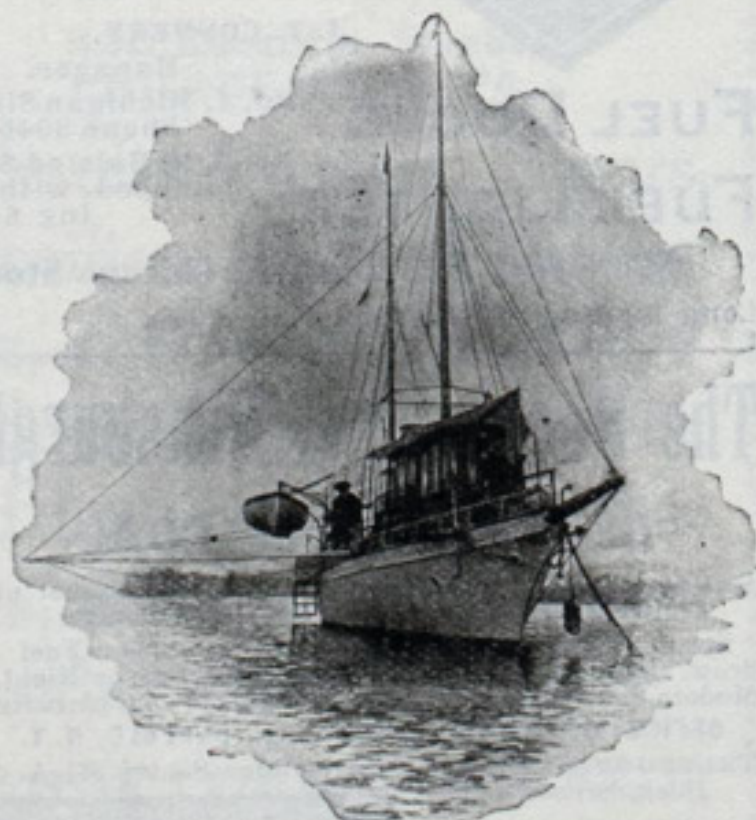
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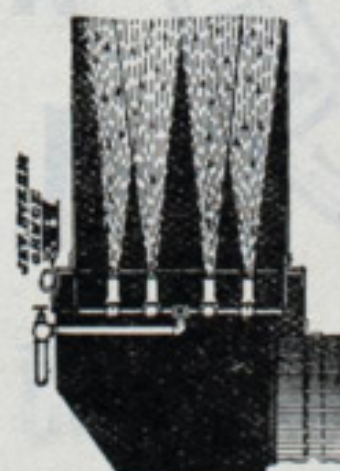


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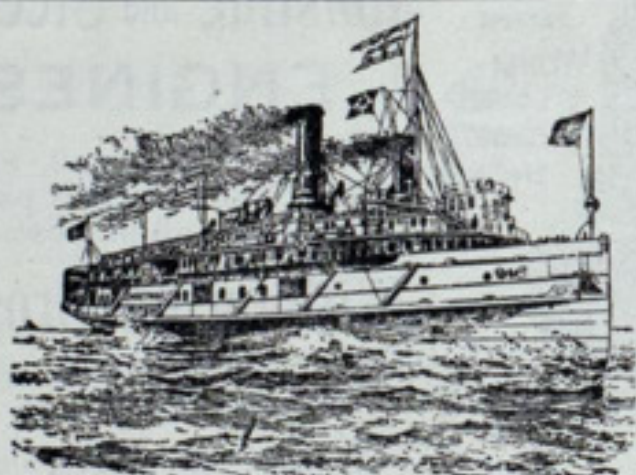
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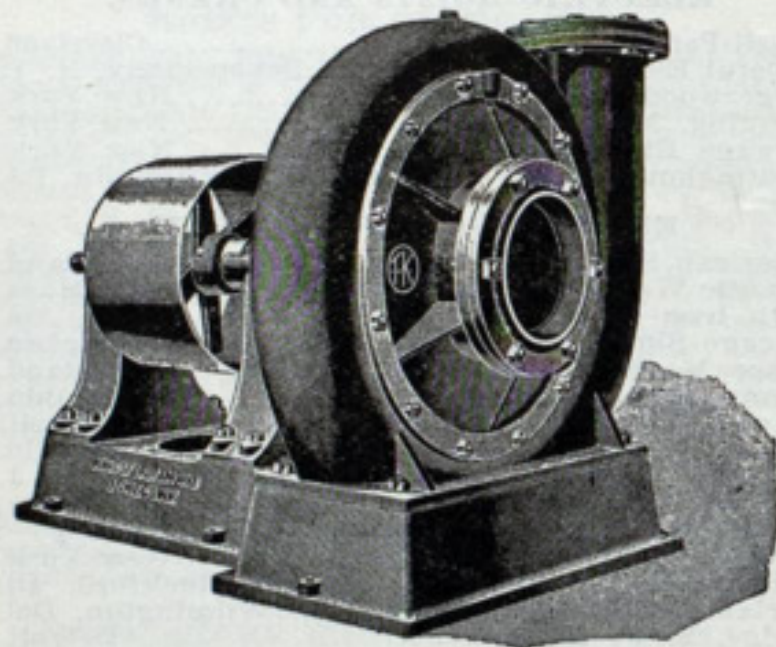
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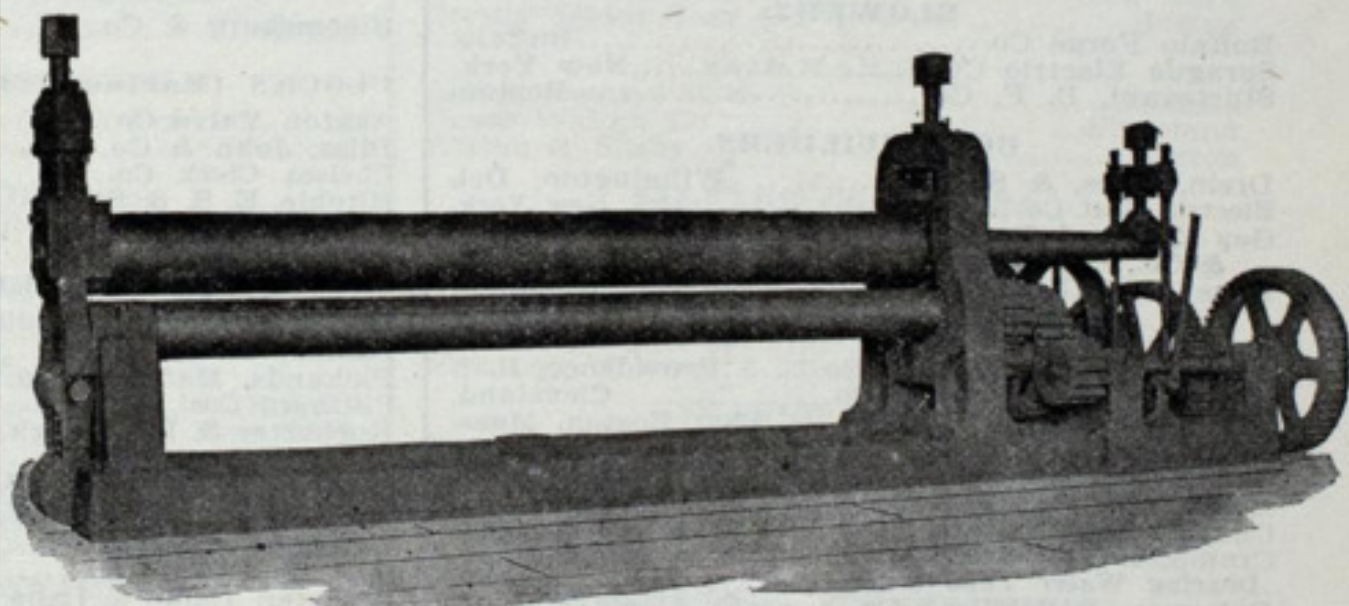


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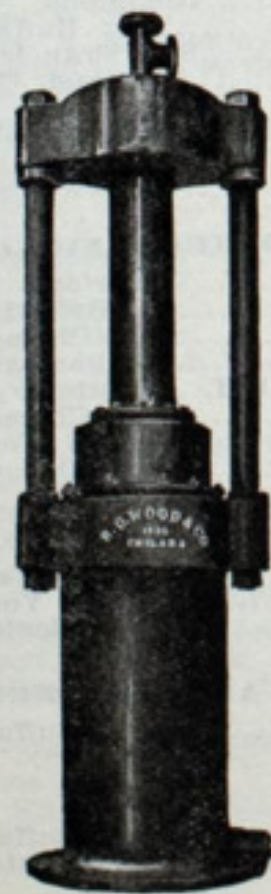
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See, Horace.....New York.
Wood, W. J.....Chicago.

FANS FOR VENTILATION, EXHAUST, ETC.

Buffalo Forge Co.....Buffalo.
Sprague Electric Co.....New York.
Sturtevant, B. F. Co.....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert.....Buffalo.

FORGES.

Buffalo Forge Co.....Buffalo.
Sturtevant Co., B. F.....Boston.

FORGINGS, IRON AND STEEL.

Bethlehem Steel Co.....South Bethlehem.
Bourne-Fuller Co.....Cleveland.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

FIXTURES FOR LAMPS, OIL AND ELECTRIC.
Page Bros. & Co.....Boston.**FLUSHOMETERS.**

Kenney, The Co.....New York.

FUELING COMPANIES AND COAL DEALERS.

Castner, Curran & Bullitt (Pocahontas).....
Philadelphia.
 Graham, James & Co.....Detroit.
 Hanna, M. A. & Co.....Cleveland.
 Pickands, Mather & Co.....Cleveland.
 Pittsburg Coal Co.....Cleveland.
 Rochester & Pittsburgh Coal & Iron Co.....Buffalo.
 Smith, Stanley B. & Co.....Detroit.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

GAS AND GASOLINE ENGINES.

Chicago Water Motor & Fan Co.....Chicago.
 Giddings & Stevens.....Rockford, Ill.
 McMyler Mfg. Co.....Cleveland.
 Olds Motor Works.....Detroit.

GAGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.
 Ashton Valve Co.....Boston.
 Crosby Steam Gage & Valve Co.....Boston.
 Manning, Maxwell & Moore.....New York.
 See also valves and steam specialties.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

HAMMERS, PNEUMATIC.

Chicago Pneumatic Tool Co.....Chicago.
 Philadelphia Pneumatic Tool Co.....Philadelphia.
 Q. & C. Co.....Chicago.

HAMMERS, POWER DROP.

Bement, Miles & Co.....Philadelphia.
 Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant Co., B. F.....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
 Brown Hoisting & Conveying Mach. Co.....Cleveland.
 Chase Machine Co.....Cleveland.
 Donohue & Co., John T.....Baltimore.
 Elwell-Parker Electric Co.....Cleveland.
 General Electric Co.....New York.
 Hodge, S. F. & Co.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Lidgerwood Mfg. Co.....New York.
 Manning, Maxwell & Moore.....New York.
 McMyler Mfg. Co.....Cleveland.
 Marine Iron Co.....Bay City.
 Sprague Electric Co.....New York.
 Williamson Bros.....Philadelphia.
 Westinghouse Electric & Mfg. Co.....Pittsburg.

HOSE—AIR.

Chicago Pneumatic Tool Co.....Chicago.
 Manning, Maxwell & Moore.....New York.
 Philadelphia Pneumatic Tool Co.....Philadelphia.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
 Ashton Valve Co.....Boston.
 Ashcroft Mfg. Co.....New York.
 Crosby Steam Gage & Valve Co.....Boston.

INJECTORS.

Jenkins Bros.....New York.
 Hayden & Derby Mfg. Co.....New York.
 Penberthy Injector Co.....Detroit.

INSURANCE, MARINE.

Brown & Co.....Buffalo.
 Drake & Maytham.....Buffalo.
 Elphicke, C. W. & Co.....Chicago.
 Gibbs & Joys.....Milwaukee.
 Hawgood & Moore.....Cleveland.
 Hutchinson & Co.....Cleveland.
 Keith, J. G. & Co.....Chicago.
 La Salle & Co.....Duluth.
 Mitchell & Co.....Cleveland.
 Myers, James A.....Chicago.
 Osborn & Co., F. H.....Chicago.
 Pauly, H. J.....Milwaukee.
 Parker & Millen.....Detroit.
 Peck, Chas. E. & W. F.....New York and Chicago.
 Richardson, W. C.....Cleveland.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland.
 Hanna, M. A. & Co.....Cleveland.
 Pickands, Mather & Co.....Cleveland.

LATHES OF ALL KINDS.

American Tool Works Co. (The).....Cincinnati.
 Bement, Miles & Co.....Philadelphia.
 Manning, Maxwell & Moore.....New York.

LAUNCHES—NAPHTHA, ELECTRIC.

Electric Boat Co.....New York.
 Gas Engine & Power Co.....New York.

LIFE BOATS—METALLIC.

Dreih, Thos. & Son.....Wilmington, Del.
 Kahnweiler's Sons, D.....New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS, RAFTS, ETC.

Armstrong Cork Co.....Pittsburg.
 Dreih, Thos. & Son.....Wilmington, Del.
 Kahnweiler's Sons, D.....New York.
 Lane & DeGroot.....Brooklyn.

LIGHTS, SIDE AND SIGNAL.

Page Bros. & Co.....Boston.

LUBRICATING PUMPS.

Manzel Bros.....Buffalo.
 Phenix Metallic Packing Co.....Chicago.
 Sterling Lubricator Co.....Rochester, N. Y.

MACHINE TOOLS.

American Tool Works Co. (The).....Cincinnati.
 Bement, Miles & Co.....Philadelphia.
 Manning, Maxwell & Moore.....New York.

MAST HOOPS.

Donohue & Co., John T.....Baltimore.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.
 Mechanical Fabric Co.....Providence, R. I.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.
 Phenix Metallic Packing Co.....Chicago.
 U. S. Metallic Packing Co.....Philadelphia.

METALS FOR BEARINGS.

Ajax Metal Co.....Philadelphia.
 Cramp, Wm. & Sons.....Philadelphia.
 Illinois Smelting & Refining Works.....Chicago.
 Magnolia Metal Co.....New York.
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co.....Boston, Mass.

MILLING MACHINES OF ALL KINDS.

American Tool Works Co. (The).....Cincinnati.
 Bement, Miles & Co.....Philadelphia.
 Manning, Maxwell & Moore.....New York.

NAUTICAL INSTRUMENTS.

Bliss, John & Co.....New York.
 Ritchie & Sons, E. S.....Brookline, Mass.
 Also most of the ship chandlers.

NAVAL ARCHITECTS.

Curr, Robert.....Cleveland.
 Hillman, Gustav.....Brooklyn.
 Kirby, Frank E.....Detroit.
 See, Horace.....New York.
 Wood, W. J.....Chicago.

NICKEL STEEL FORGINGS.

Bethlehem Steel Co.....So. Bethlehem, Pa.

OAK, TIMBER AND PLANK.

Martin-Barriss Co.....Cleveland.

OILS AND LUBRICANTS.

Dixon Crucible Co., Jos.....Jersey City, N. J.
 Standard Oil Co.....Cleveland.

PACKING.

Jenkins Bros.....New York.
 Katzenstein, L. & Co.....New York.
 Phenix Metallic Packing Co.....Chicago.
 U. S. Metallic Packing Co.....Philadelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
 Smith, Edward & Co.....New York.
 Upson-Walton Co.....Cleveland.

PAINTING MACHINES, PNEUMATIC.

Chicago Pneumatic Tool Co.....Chicago.

PATENT ATTORNEYS.

Thurston & Bates.....Cleveland.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland.

PLANERS OF ALL KINDS.

American Tool Works Co. (The).....Cincinnati.
 Bement, Miles & Co.....Philadelphia.
 Manning, Maxwell & Moore.....New York.

PLUMBING, MARINE.

Ellis Marine Plumbing Co.....New York.
 Mott Iron Works, J. L.....New York.
 Sands, Alfred B. & Son.....New York.
 Kenney, The Co.....New York.

PNEUMATIC TOOLS.

Chicago Pneumatic Tool Co.....Chicago.
 Manning, Maxwell & Moore.....New York.
 Philadelphia Pneumatic Tool Co.....Philadelphia.
 Q. & C. Co.....Chicago.

POCAHONTAS COAL.

Castner, Curran & Bullitt.....Philadelphia.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston, Mass.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
 Atlantic Works.....East Boston, Mass.
 Bath Iron Works Ltd.....Bath, Me.
 Cramp, Wm. & Sons.....Philadelphia.
 Detroit Shipbuilding Co.....Detroit.
 Farrar & Trefts.....Buffalo.
 Fore River Engine Co.....Weymouth, Mass.
 Hyde Windlass Co.....Bath Me.

Harlan & Hollingsworth Co.....Wilmington, Del.
 Hodge, S. F. & Co.....Detroit.
 Jenks Ship Building Co.....Port Huron, Mich.
 MacKinnon Mfg Co.....Bay City, Mich.
 Maryland Steel Co.....Sparrow's Point, Md.
 Moran Bros. Co.....Seattle, Wash.
 Morse Iron Works & Dry Dock Co.....Brooklyn.
 Neafie & Levy Ship & Eng. Bldg Co.....Philadelphia.
 Newport News Ship Bldg. Co.....Newport News, Va.
 Nixon, Lewis.....Elizabeth, N. J.
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.
 Pusey & Jones Co.....Wilmington, Del.
 Sheriffs Mfg. Co.....Milwaukee.
 Trigg, Wm. R. Co.....Richmond, Va.
 Trout, H. G.....Buffalo.
 Union Iron Works.....San Francisco.
 Wolff & Zwicker Iron Works.....Portland, Ore.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
 General Electric Co.....Schenectady, N. Y.
 Rushmore Dynamo Works.....Jersey City, N. J.
 Sprague Electric Co.....New York.
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co.....New York.
 Davidson, M. T.....Brooklyn, N. Y.
 Donohue & Co., John T.....Baltimore.
 Kingsford Foundry & Machine Works.....
Oswego, N. Y.
 Van Duzen, The E. W. Co.....Cincinnati.
 Worthington, Henry R.....New York.

PUNCHES, RIVETERS, SHEARS.

American Tool Works Co. (The).....Cincinnati.
 Bement, Miles & Co.....Philadelphia.
 Cleveland Punch & Shear Works Co.....Cleveland.
 Long & Allstatter Co.....Cincinnati.
 Manning, Maxwell & Moore.....New York.
 New Doty Mfg. Co.....Janesville, Wis.
 Philadelphia Pneumatic Tool Co.....Philadelphia.
 Wood & Co., R. D.....Philadelphia.

RANGES, KITCHEN OUTFITS.

Born Steel Range & Mfg. Co.....Cleveland.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Chicago.

RELEASING HOOKS FOR DETACHING BOATS.

Standard Aut. Releasing Hook Co.....New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland.
 Champion Rivet Co.....Cleveland.

RUBBER INSULATED WIRES.

Roebbling's Sons, John A.....New York and Cleveland.

SAFETY VALVES.

American Steam Gauge Co.....Boston.
 Ashton Valve Co.....Boston.
 Consolidated Safety Valve Co.....New York.
 Crosby Steam Gage & Valve Co.....Boston.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
 Upson-Walton Co.....Cleveland.
 Wilson & Silsby.....Boston.

SALVAGE COMPANIES.

See wrecking companies.

SCREW MACHINES.

American Tool Works Co. (The).....Cincinnati.
 Bement, Miles & Co.....Philadelphia.
 Manning, Maxwell & Moore.....New York.

SEARCH LIGHTS.

Elwell-Parker Electric Co.....Cleveland.
 General Electric Co.....Schenectady, N. Y.
 Rushmore Dynamo Works.....Jersey City, N. J.
 Sprague Electric Co.....New York.
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

SEPARATORS, (CENTRIFUGAL).

Keystone Engine & Machine Works.....Philadelphia.

SHAPERS.

American Tool Works Co. (The).....Cincinnati.
 Manning, Maxwell & Moore.....New York.

SHEARS.

See punches, riveters and shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
 Atlantic Works.....East Boston, Mass.
 Bath Iron Works, Ltd.....Bath, Me.
 Cramp, Wm. & Sons.....Philadelphia.
 Craig Ship Building Co.....Toledo, O.
 Chicago Ship Building Co.....Chicago.
 Detroit Shipbuilding Co.....Detroit.
 Fore River Engine Co.....Weymouth, Mass.
 Harlan & Hollingsworth Co.....Wilmington, Del.
 Iowa Iron Works.....Dubuque, Ia.
 Jenks Ship Building Co.....Port Huron, Mich.
 McWilliams, Frank.....1 Broadway, New York.
 Maryland Steel Co.....Sparrow's Point, Md.
 Moran Bros. Co.....Seattle, Wash.
 Morse Iron Works & Dry Dock Co.....Brooklyn.
 Neafie & Levy Ship & Eng. Bldg. Co.....Philadelphia.
 Newport News Ship Bldg. Co.....Newport News, Va.
 Nixon, Lewis.....Elizabeth, N. J.
 Pusey & Jones Co.....Wilmington, Del.
 Roach's Ship Yard.....Chester, Pa.
 Townsend & Downey Ship Bldg. Co.....New York.
 Trigg, Wm. R. Co.....Richmond, Va.
 Union Dry Dock Co.....Buffalo.
 Union Iron Works.....San Francisco.
 Wolff & Zwicker Iron Works.....Portland, Ore.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
Moran, Bros. Co.....Seattle, Wash.
Upson-Walton Co.....Cleveland.

SLING FRAME FOR HANDLING BARRELS.
Patriarche, H. R.....Milwaukee.

SPARS—LARGE SIZES.
Moran Bros. Co.....Seattle, Wash.

STAYBOLT IRON, HOLLOW AND SOLID.
Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAMSHIP LINES, PASS. AND FREIGHT.
American Line.....New York.
International Nav. Co.....Philadelphia.
Red Star Line.....New York.

STEAM VESSEL FOR SALE.
Holmes, Samuel.....New York.

STEEL SHAFTS, SOLID OR HOLLOW.
Bethlehem Steel Co.....So. Bethlehem, Pa.

STEERING APPARATUS.
American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Detroit Shipbuilding Co.....Detroit.
Donohue & Co., John T.....Baltimore.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Queen City Engineering Co.....Buffalo.
Sheriffs Mfg. Co.....Milwaukee.
Williamson Bros.....Philadelphia.

STOKERS FOR MARINE SERVICE.
American Stoker Co.....New York.

STOCKS, BONDS, SECURITIES.
Wright, Herbert & Co.....Cleveland.

STOCKLESS ANCHORS.
Baldt Anchor Co.....Chester, Pa.
International Anchor Co.....Cleveland.

STRUCTURES OF STEEL, BUILDERS OF.
Berlin Iron Bridge Co.....East Berlin, Conn.

SURVEYORS, MARINE.
Curr, Robert.....Cleveland.
Gibbs & Joys.....Milwaukee.

TELEGRAPH—DECK AND ENGINE ROOM.
Cory, Chas. & Son.....New York.

TESTS OF MATERIAL.

Hunt, Robert W. & Co.....Chicago.
Pittsburgh Testing Laboratory, Ltd.....Pittsburgh.

THRUST COLLARS FOR PROPELLER SHAFTS.
Ball Bearing Co.....Boston, Mass.

TIMBER—LARGE PIECES.
Moran Bros. Co.....Seattle, Wash.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

American Tool Works Co. (The).....Cincinnati.
Bement, Miles & Co.....Philadelphia.
Chicago Pneumatic Tool Co.....Chicago.
Cleveland Punch & Shear Works Co.....Cleveland.
Long & Allstatter, The Co.....Hamilton, O.
Manning, Maxwell & Moore.....New York.
New Doty Mfg. Co.....Janesville, Wis.
Philadelphia Pneumatic Tool Co.....Philadelphia.
Q. & C. Co.....Chicago.
Wood & Co., R. D.....Philadelphia.

TRUCKS.

Boston & Lockport Block Co.....Boston, Mass.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Calvin Co., The.....Kingston, Ont.
Donnelly Salvage & Wrecking Co.....Kingston, Ont.
Swain Wrecking Co.....Detroit.

TUBING, STEEL, COPPER AND BRASS.

Atlantic Tube Co.....Pittsburgh.
Hungerford Brass & Copper Co., U. T.....New York.
Merchant & Co., Inc.....Philadelphia.
Shelby Steel Tube Co.....Cleveland.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Crosby Steam Gauge & Valve Co.....Boston.
Jenkins Bros.....New York.
Manning, Maxwell & Moore.....New York.

VARNISH MAKERS, COLOR GRINDERS, ETC.
Smith, Edward & Co.....New York.

VARNISH PAINT.

Mair, John & Son.....Philadelphia.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Drake & Maytham.....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Gibbs & Joys.....Milwaukee.

Hall & Root.....Buffalo.
Hawgood & Moore.....Cleveland.
Holmes, Samuel.....New York.
Hutchinson & Co.....Cleveland.
Kelth, J. G. & Co.....Chicago.
Miller, Bull & Knowlton.....New York.
Mitchell & Co.....Cleveland.
Myers, James A.....Chicago.
Pauly, H. J.....Milwaukee.
Richardson, W. C.....Cleveland.

VENTILATING APPARATUS FOR SHIPS.

Buffalo Forge Co.....Buffalo.
Sprague Electric Co.....New York.
Sturtevant Co., B. F.....Boston.

WIRE ROPE.

American Steel & Wire Co.....Chicago.
Baker, H. H. & Co.....Buffalo.
Roebbing's Sons, John A.....New York and Cleveland.
Upson-Walton Co.....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Crosby Steam Gauge & Valve Co.....Boston.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Woods Machine Co., S. A.....So. Boston.

WORM GEARING.

Morse, Williams & Co.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Calvin Co., The.....Kingston, Ont.
Donnelly Salvage & Wrecking Co.....Kingston, Ont.
Playfair's Barge & Tug Line.....Midland, Ont.
Salvage Association of No. America.....Chicago.
Swain Wrecking Co.....Detroit.

YACHT SAILS, FITTINGS, HARDWARE, ETC.

Wilson & Silsby.....Boston.
See also ship chandlers.

YACHT AND BOAT BUILDERS.

Drain, Thos. & Son.....Wilmington, Del.
Electric Boat Co.....New York.
Gas Engine & Power Co.....New York.
Lane & DeGroot.....Brooklyn.

YAWLS.

Drain, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Brooklyn.

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200,000 IN USE.

PENBERTHY

TRADE MARK.

AUTOMATIC INJECTOR.

Efficiency, 99.27 Per Cent.

The World's Best BOILER FEEDER.

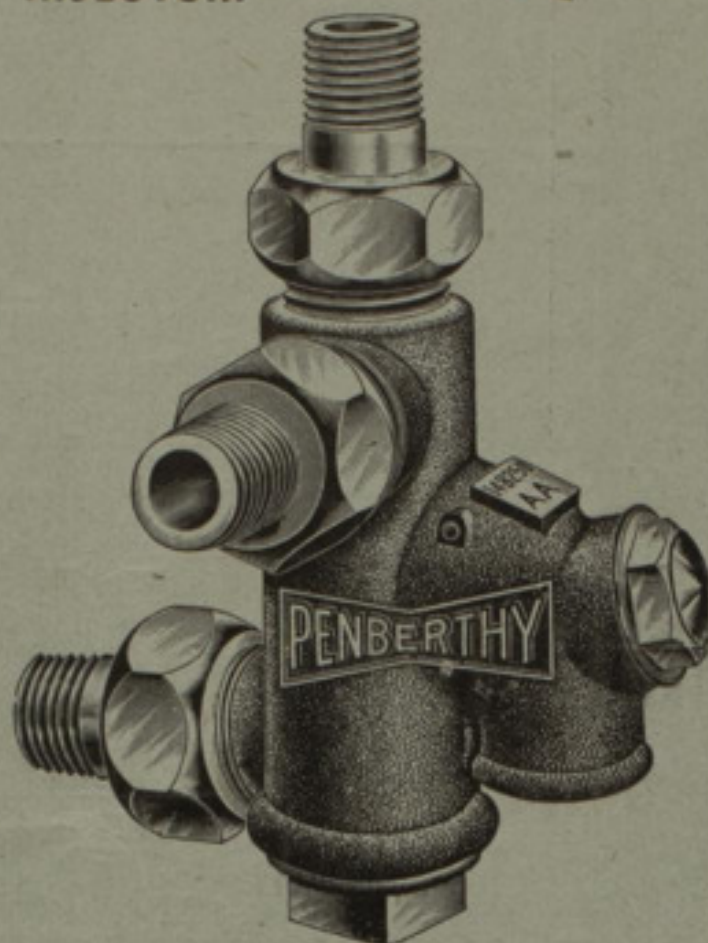
Made with FLANGES when DESIRED.

All Sizes — 4 H. P. to 600 H. P.

**Penberthy
Injector Co.,**

Detroit, Mich.

Branch Factory: WINDSOR, CAN.



LAKE SHORE & MICHIGAN SOUTHERN RAILWAY.

CLEVELAND CITY TICKET OFFICE,
237 SUPERIOR STREET.

	Arrive from West.	Depart East.
Eastward:—		
No. 18, Southwestern Limited.....	.....	*1 55 am
No. 22, Lake Shore Limited.....	*2 15 am	*2 20 am
No. 28, New York & Boston Exp..	*7 40 am	*8 00 am
No. 32, Fast Mail	*11 20 am	*11 25 am
No. 44, Accom. via Sandusky.....	†1 15 pm	.....
No. 46, Southwestern Express .....	.....	*3 00 pm
No. 6, Limited Fast Mail.....	*5 40 pm	*5 45 pm
No. 10, C., N. Y. & Boston Special	*7 35 pm	*7 40 pm
No. 2 Day Express	†9 10 pm	†9 35 pm
No. 126, Norwalk Accommodation..	†7 55 am	.....
No. 40, Tol. & Buff. Ac., v. Norw'k	†10 00 am	†10 30 am
No. 116, Conneaut Accommodation.	.....	†4 30 pm

	Arrive from East.	Depart West.
Westward:—		
No. 11, Southwestern Limited.....	*3 20 am	.....
No. 15, N. Y., Bos. & Chi. Spl....	*3 55 am	*4 05 am
No. 7, Day Express .....	.....	†6 30 am
No. 19, The Lake Shore Ltd.....	*7 45 am	*7 50 am
No. 23, Western Express	*11 10 am	*11 15 am
No. 33, Southwestern Express.....	*11 25 pm	.....
No. 31, United States Express.....	.....	*12 10 pm
No. 47, Accommodation .....	.....	†3 00 pm
No. 141, Sandusky Accommodation.	.....	†3 10 pm
No. 127, Norwalk Accommodation..	.....	†5 10 pm
No. 37, Pacific Express	*6 35 pm	*7 00 pm
No. 3, Fast Mail Limited.....	*10 50 pm	*10 55 pm

*Daily, †Daily except Sunday. ‡Daily except Monday.
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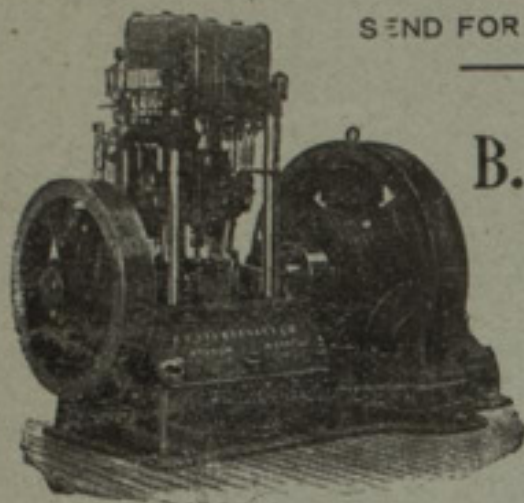
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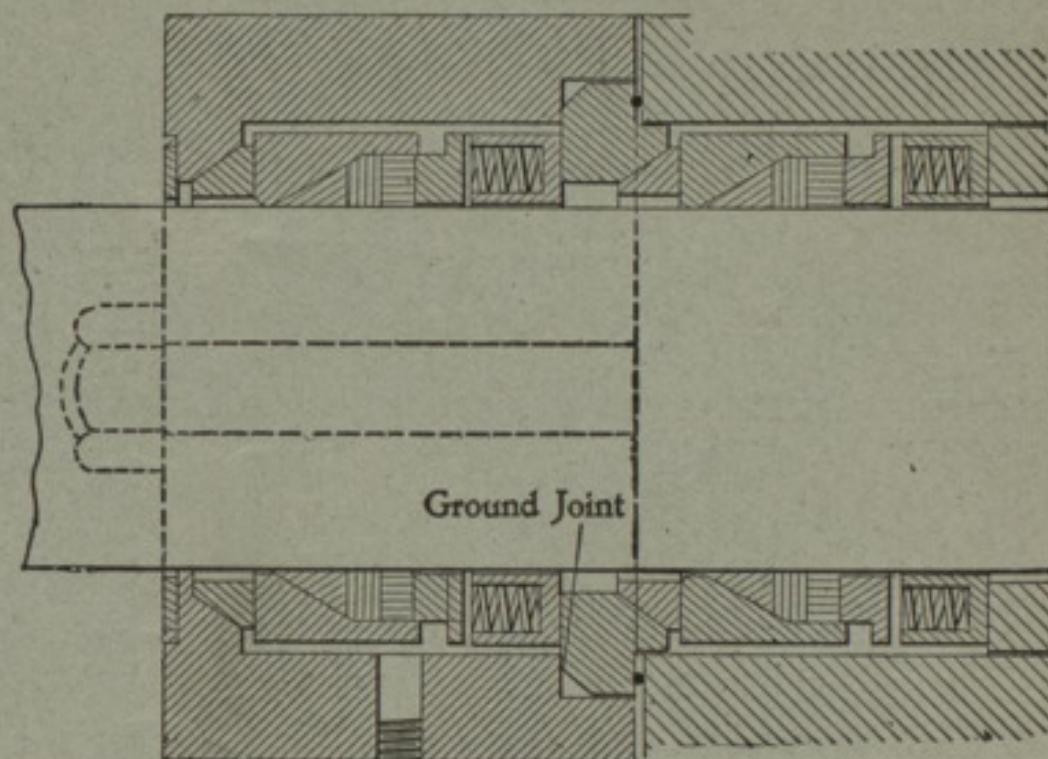
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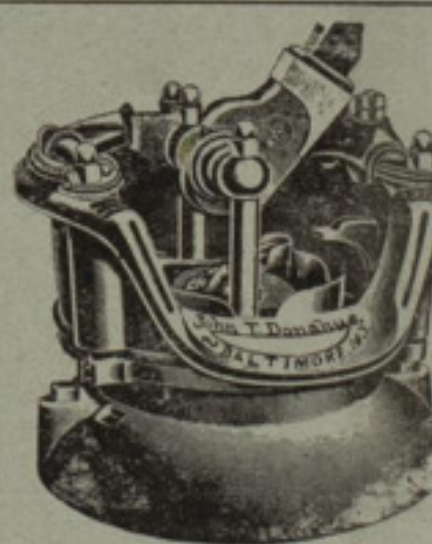
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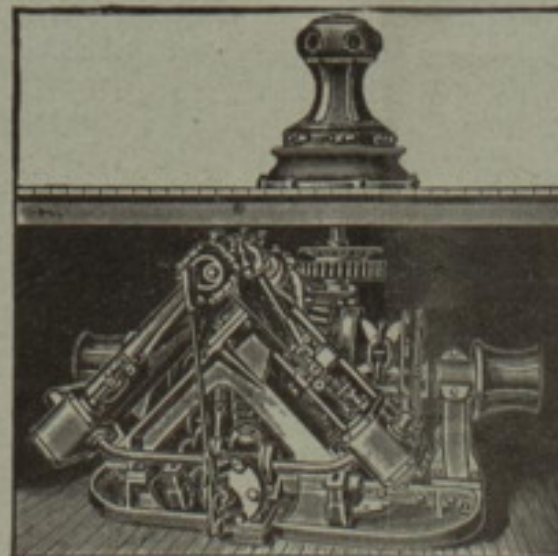
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MARINE REVIEW

VOL. XXI.

CLEVELAND, O., APRIL 19, 1900.

No. 16



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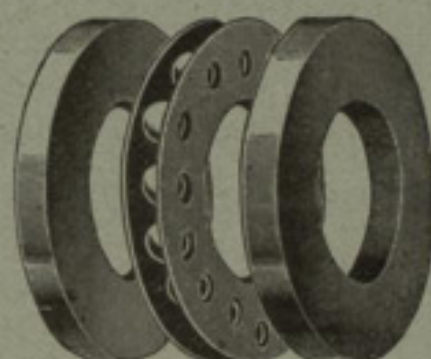
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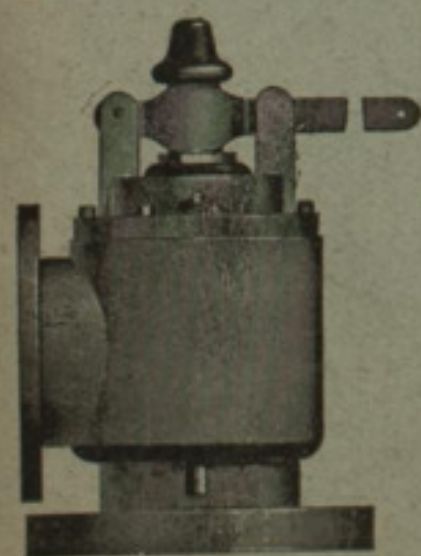
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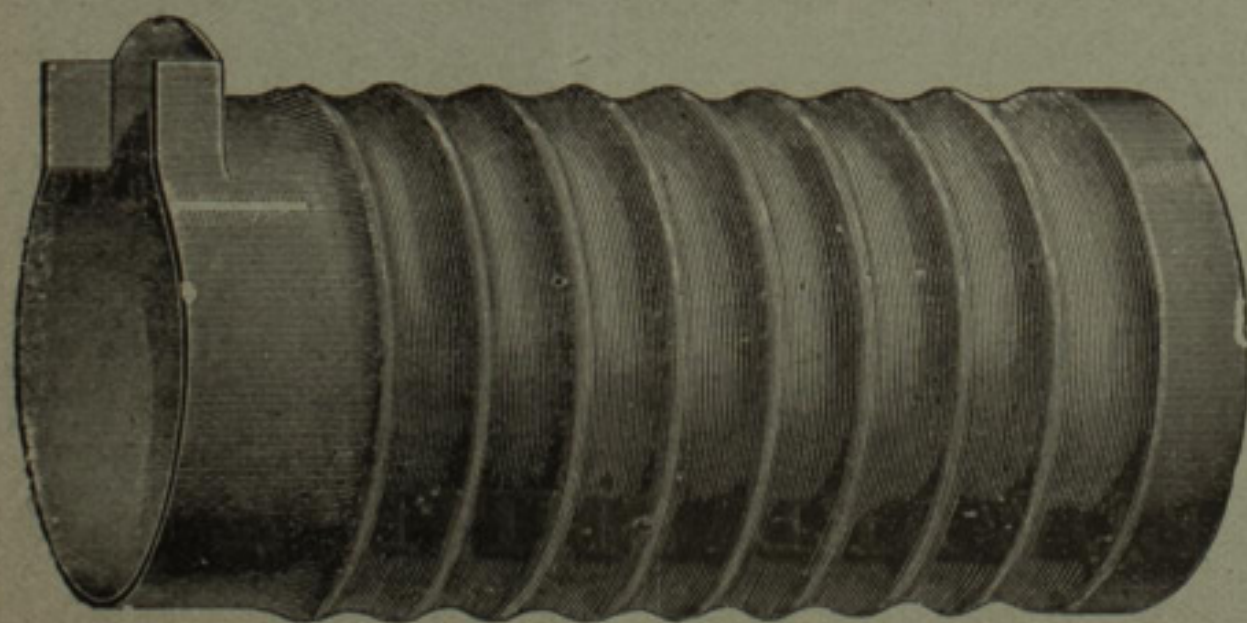
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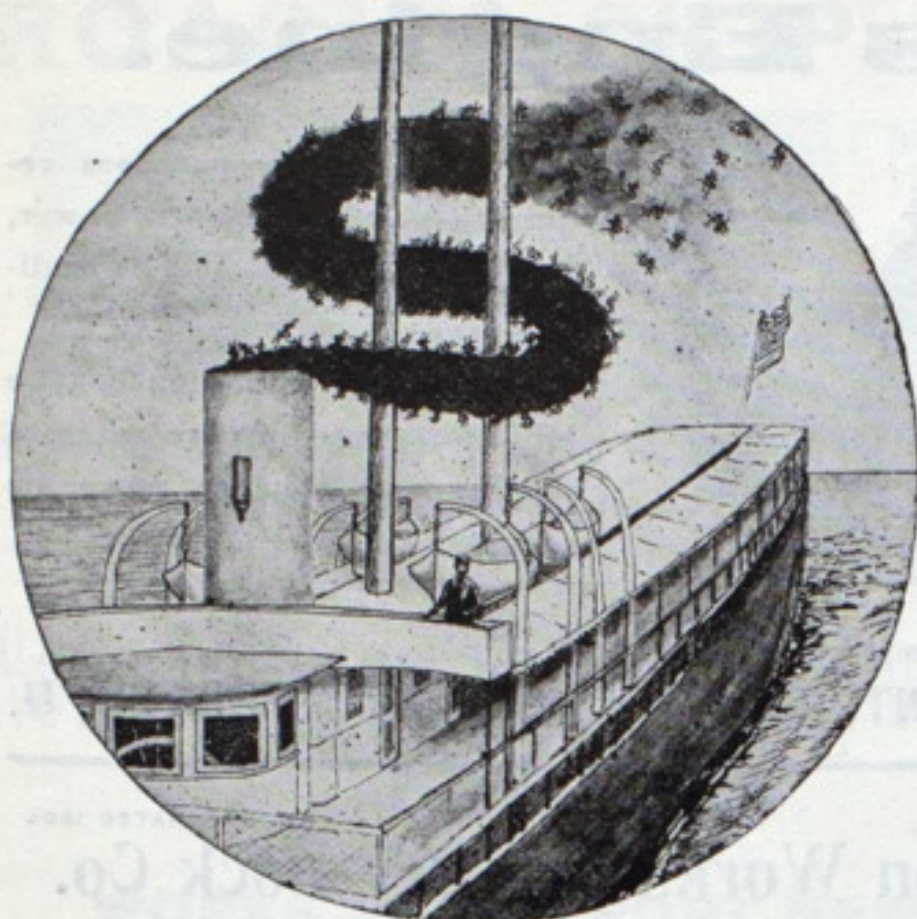
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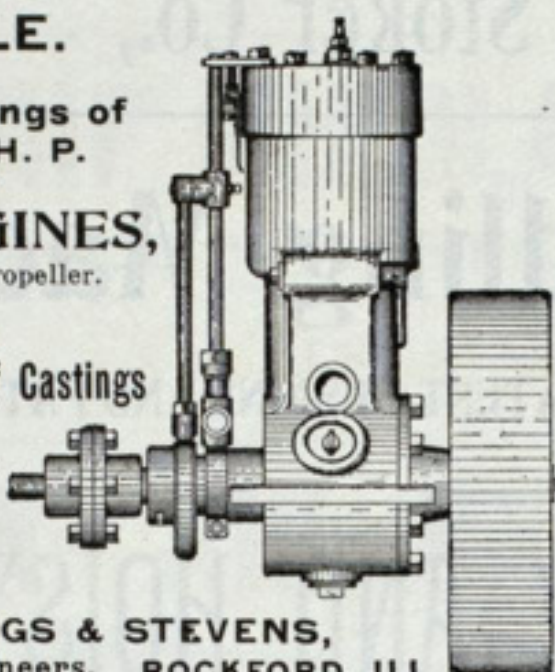
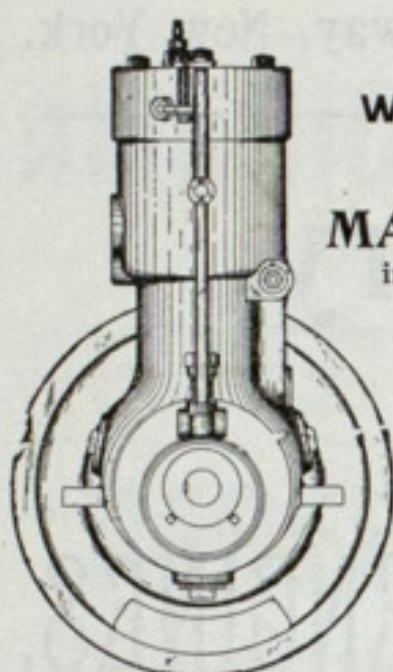
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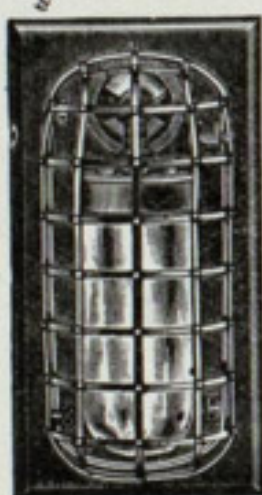
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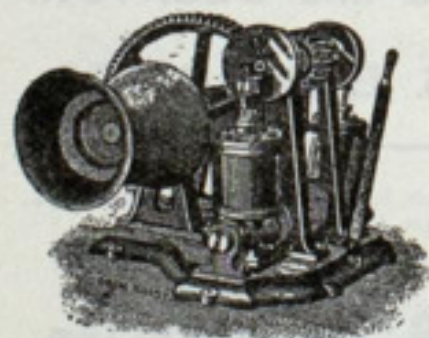
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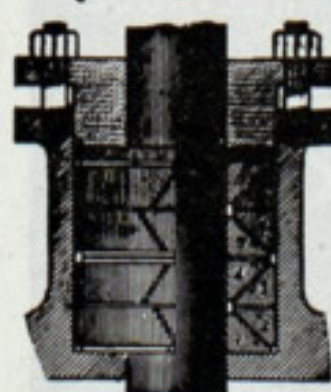
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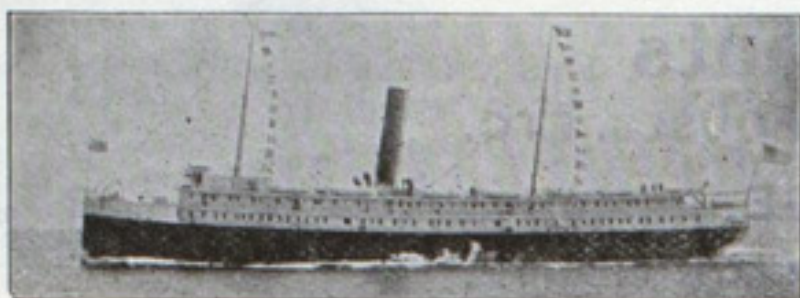
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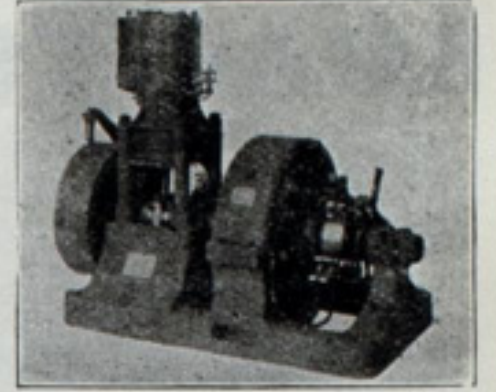
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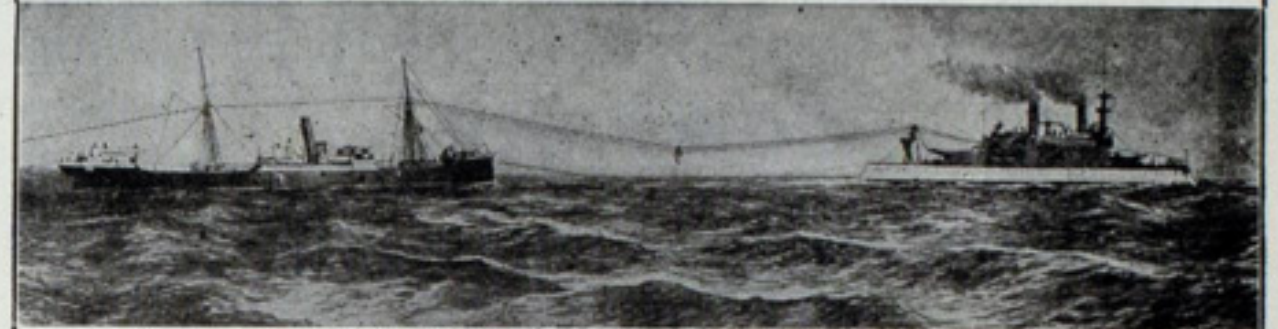
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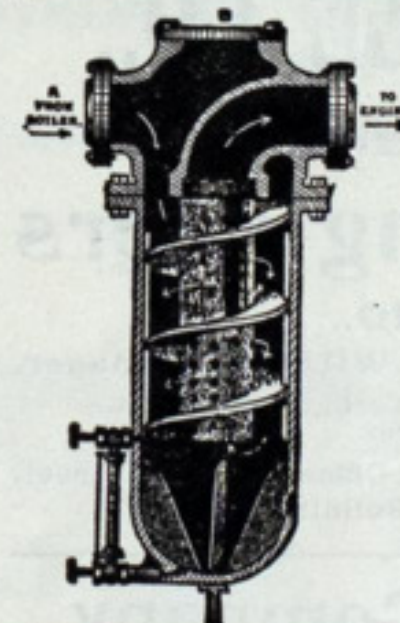
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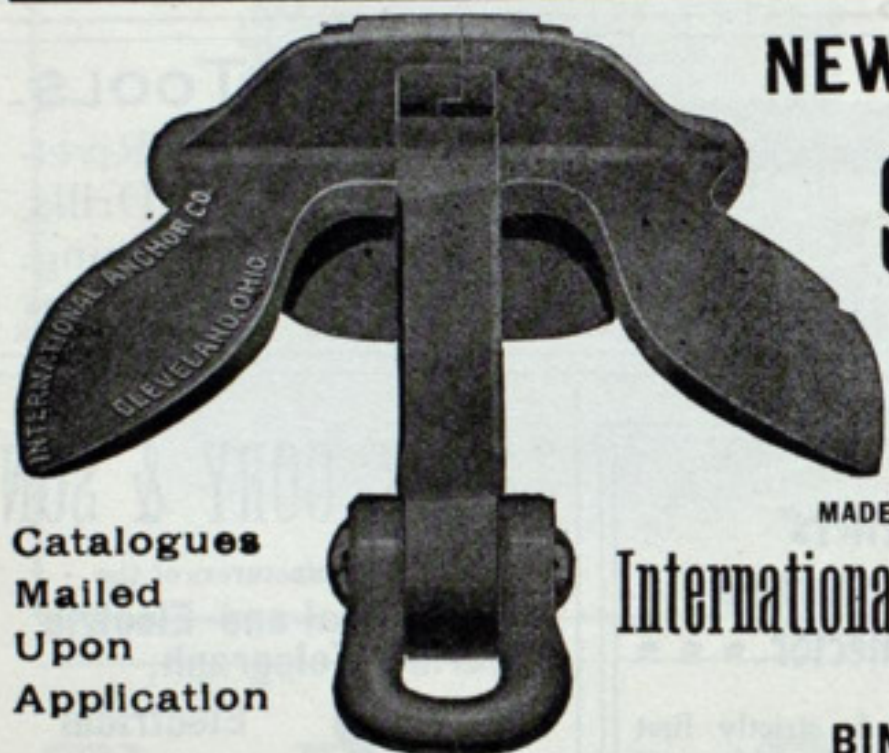
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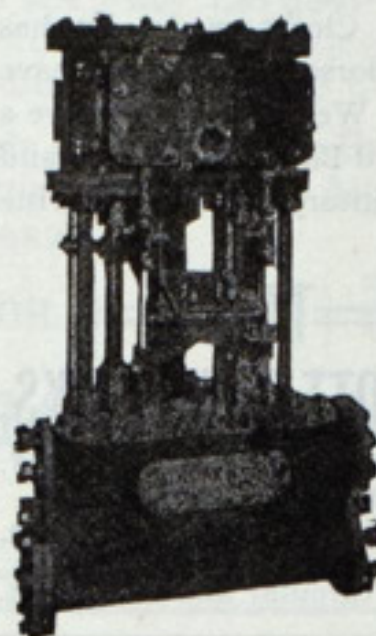
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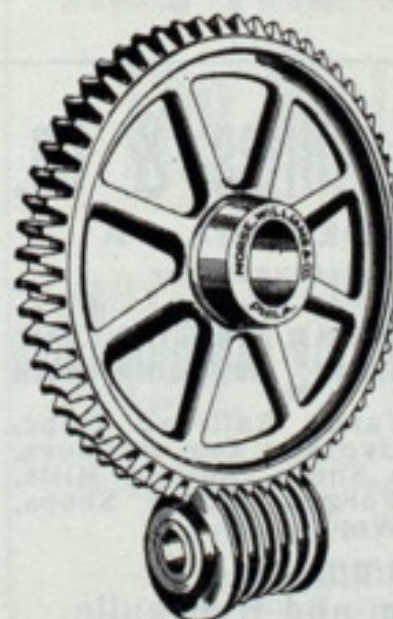
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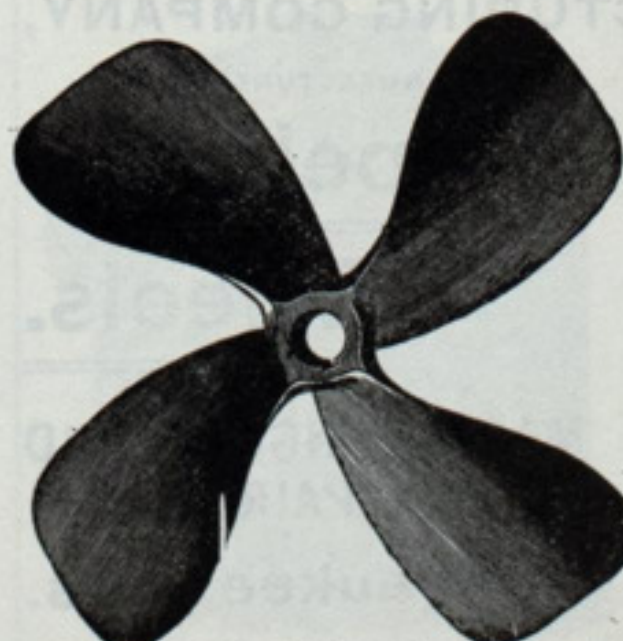
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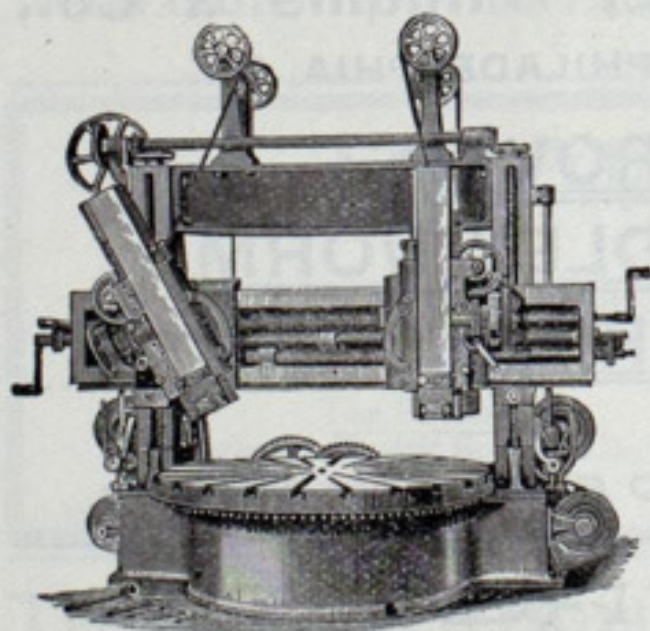
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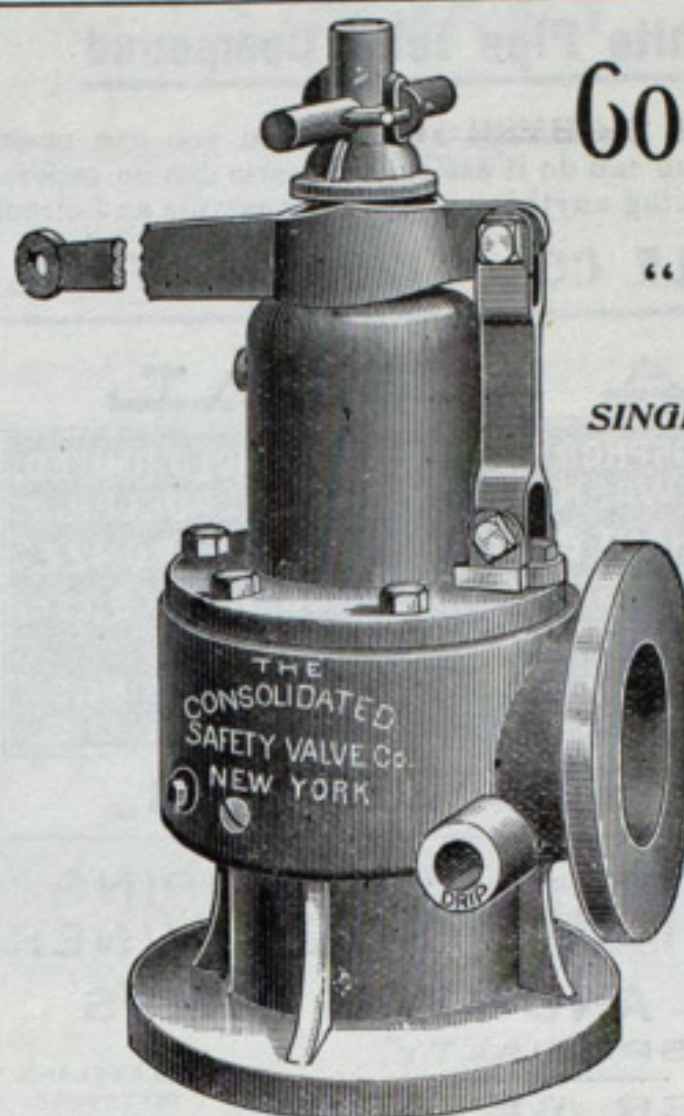
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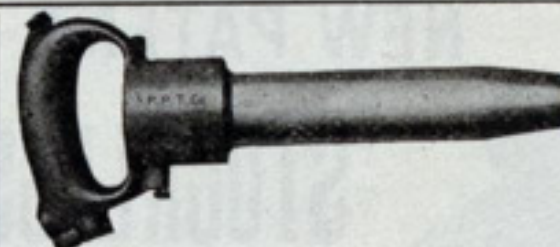
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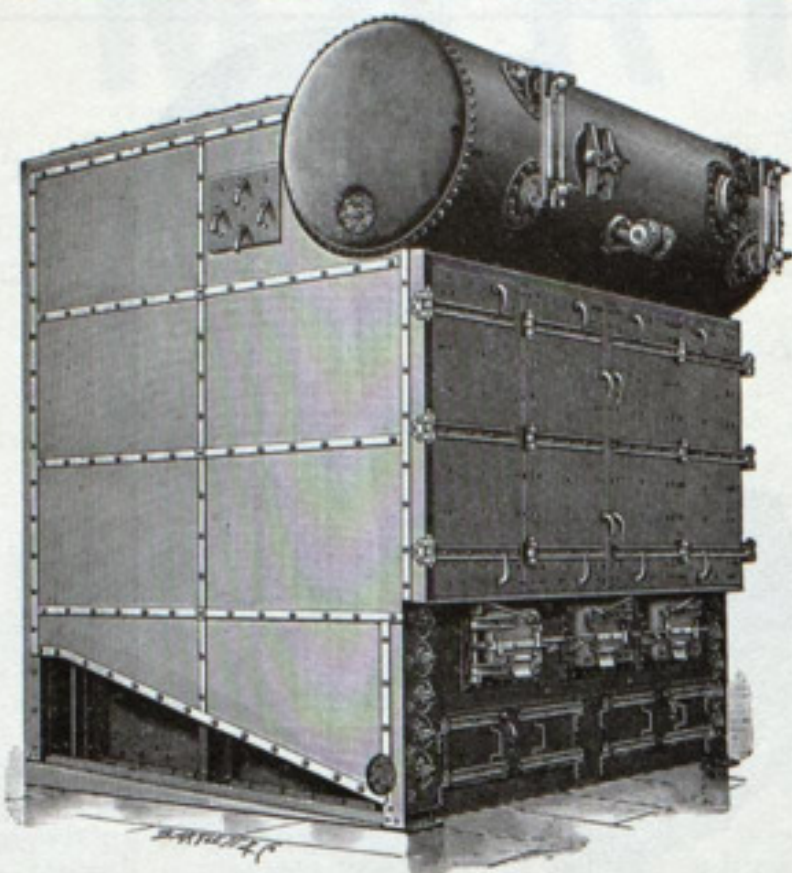
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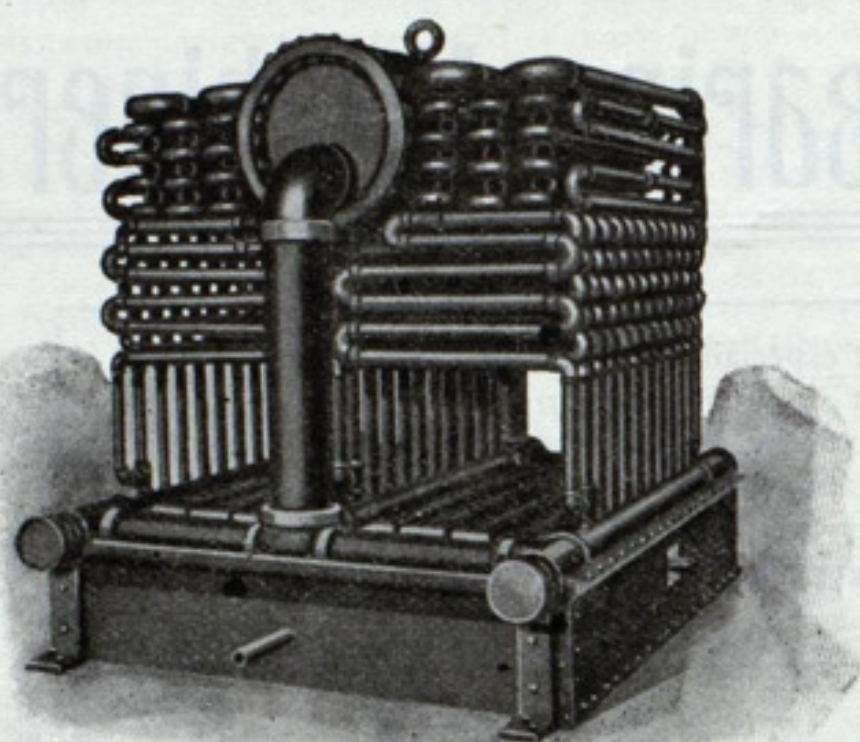
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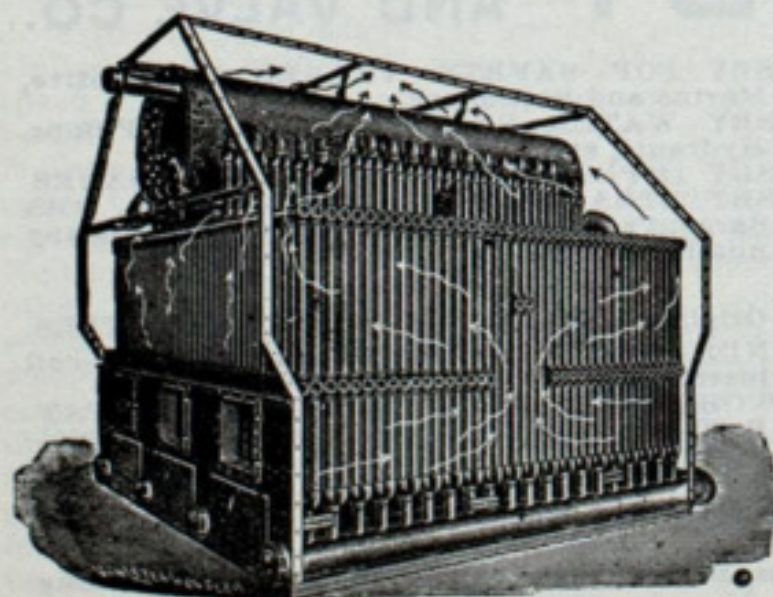
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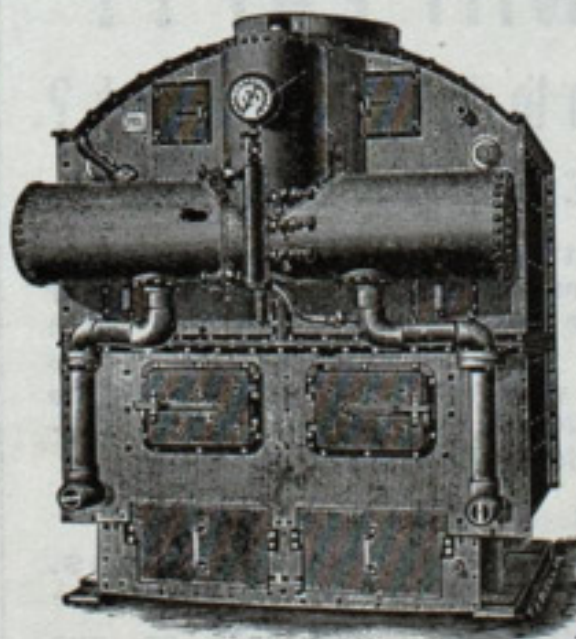
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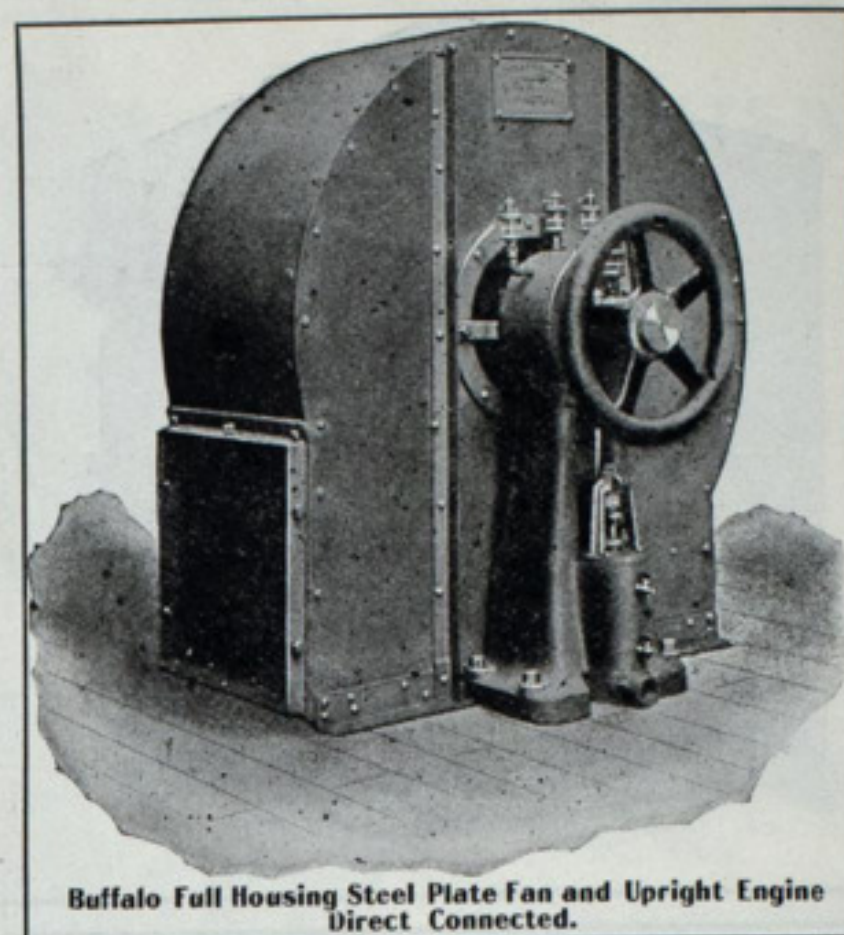
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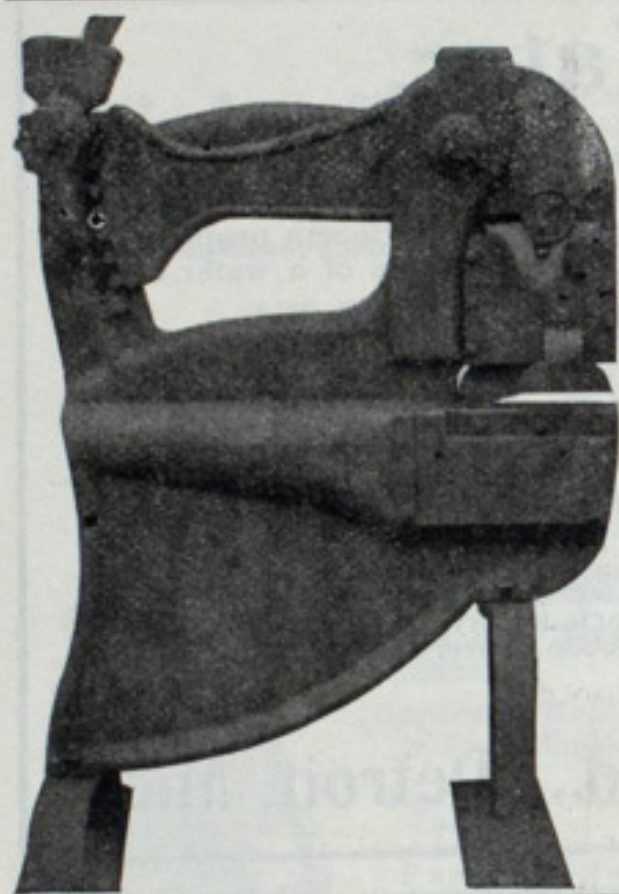
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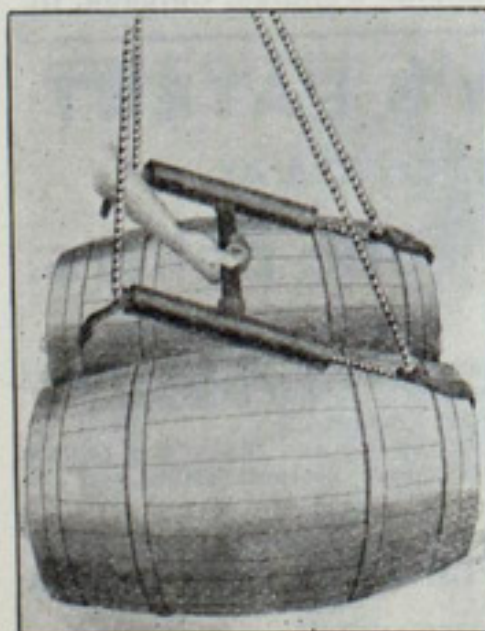
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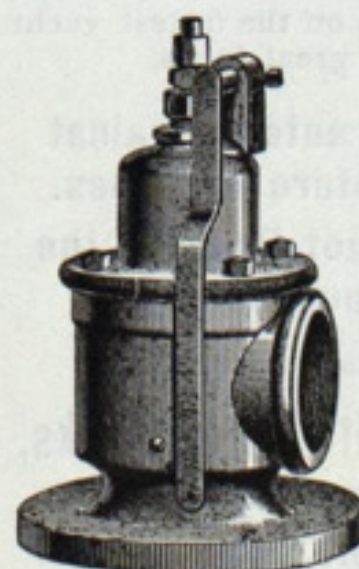
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